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U.S. DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES

REPORT

OF THE

UNITED STATES COMMISSIONER OF FISHERIES

FOR THE FISCAL YEAR 1933

WITH

APPENDIXES

FRANK T. BELL
Commissioner

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NOTE

The first section of this volume, entitled "Bureau of Fisheries", constitutes what was known in former years as "Report of the Commissioner of Fisheries." This year, in the interests of economy, it is a reprint from the "Annual Report of the Secretary of Commerce." The pagination, therefore, is the same as that of the Secretary's Report, rather than beginning with page 1 as in former years.

ERRATA

Page 163, third paragraph, third line, should read *output of byproducts.*
Page 166: Caption of table should be *Operating units*: *By sections—Continued.*
Page 177: Quantity of finnan haddie should be *2,822,179* instead of *2,282,179.*
Page 235: Catch of scup or porgy should be *2,341,430* pounds instead of *2,431,430.*
Page 294, box heads at top of page: *Sea crawfish* should be under general head *Pots.*
Page 371: Chubs, including the pounds and value under "Total," should be deleted.
Page 382: The pounds and value for shrimp under Ohio should be blank and the figures there given are for mussel shells in the same State.

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U.S. DEPARTMENT OF COMMERCE

BUREAU OF FISHERIES

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[Reprinted from the Annual Report of the Secretary of Commerce, 1933]

BUREAU OF FISHERIES

The fishing industry in all its branches has suffered severely in common with other producers of foodstuffs. The extensive decline in prices, especially of those products with which fish normally compete in the retail markets, has faced the industry with actual disaster. The complexity of the system of fish distribution, seasonal character of supply, remoteness of centers of production from population centers, and the limitation of the consumption of fish combine to make it most difficult for fishery operators to compete at present price levels. The temporary scarcity of some staples has tended to keep up the cost of production and added to the difficulties of the producers. On the other hand, advances in quick freezing, the packaging of fresh and frozen fish, and the value of marine products in the diet in combating faulty nutrition are tending to popularize fishery products with the consuming public. With the development of improvements in fish manufacture and merchandising, especially with respect to adequate display and refrigerating equipment suitable for handling quick-frozen foods satisfactorily and their more general installation in retail stores, and the education of the public to a realization that frozen foods can be fully as sound, palatable, and nutritious as the fresh products, we may expect this branch of the fishery trade to become more stabilized.

Commercial fishing by United States craft is far-reaching in its scope, being prosecuted on the high seas and in the territorial waters of the Atlantic Ocean, Pacific Ocean, and the Gulf of Mexico, as well as in the Great Lakes and in interior waters. These fisheries during the calendar year 1931 furnished employment to about 123,000 persons as fishermen; and there were 82,000 persons engaged in transporting, manufacturing, and the wholesale trade—making a total of about 200,000 persons, who depended directly upon the fisheries for a livelihood. This was about 4,000 less than were employed during the previous year. The catch in 1931 amounted to 2,657,317,000 pounds, valued at $77,344,000, a decrease of 19 percent in quantity and 29 percent in value as compared with the previous year.

The fisheries in 1931 were marked by decreases in the production of all the major groups of products; thus, the output of canned fishery products which amounted to 506,702,000 pounds, valued at $62,940,000, represented a decrease of 12 percent in quantity and 24 percent in value as compared with the previous year; byproducts, valued at $18,538,000, decreased sharply; packaged products amounting to 139,283,000 pounds, valued at $23,076,000, decreased about 11 percent in quantity and 20 percent in value; cured fishery products amounting to 98,969,000 pounds, valued at $12,364,000, decreased about 21 percent in quantity and 27 percent in value; frozen prod-

ucts amounting to 112,257,000 pounds, with an estimated value of $11,000,000, decreased 19 percent in quantity and about 33 percent in value; and fresh products (not packaged) estimated at 600,000,000 pounds, valued at $47,000,000, decreased about 25 percent in quantity and 41 percent in value.

Imports of fishery products for consumption in 1931 were valued at $43,033,000, which is 15 percent less than in the previous year, while exports of domestic fishery products were valued at $11,574,000, which is 33 percent less than in the previous year.

INTERNATIONAL RELATIONS

INTERNATIONAL PASSAMAQUODDY FISHERIES COMMISSION

The International Passamaquoddy Fisheries Commission, appointed by the joint resolution of Congress approved June 9, 1930, completed its investigation of the probable damage to the food fishes of the region which would result from the proposed construction of power dams at the mouths of the Passamaquoddy and Cobscook Bays. The investigators employed by the Commission, with the counsel of the advisory board, reported that they anticipated that the construction of the proposed dams would reduce the herring fishery inside the bays to negligible proportions, that the fishery in the adjacent area outside the bays would be affected to an unknown degree, and that there appears little probability of the dams affecting the fishery along the coast of Maine or even seriously of Grand Manan.

Owing primarily to the limitation of time, which would not permit completion of two full seasons of fieldwork, the investigations do not explain the unusual richness of the sardine herring fishery both inside and outside the proposed dams; and without an elucidation of the unique character of the area, the Commission was unable to state categorically that the projected dams might not so alter the environment as to affect seriously the results of the fishery. The investigation contributed results that greatly increase our understanding of the present water circulation, the production of plankton and the nature of the herring concentration in the region. The investigation of forces beyond these, that determine the existence of the fishery, requiring the development of new methods, has not been possible within the limits of the Commission's work.

The administrative report of the commission has been prepared and the technical reports of the investigators will be submitted during the coming year.

NORTH AMERICAN COUNCIL ON FISHERY INVESTIGATIONS

The nineteenth meeting of the council was held at Washington, D.C., on October 20 and 21, 1932, with representatives from Canada, Newfoundland, and the United States present. Views were exchanged and the progress of investigations conducted by the various countries on important North Atlantic fishing banks, including fishery statistics, bait investigations, hydrographical investigations, including a study of currents by means of drift bottles, plankton, mackerel, herring, cod, and haddock investigations, was presented for consideration and criticism.

Much attention was given to the success of biological research in predicting the abundance of the various species of fish many months in advance of the season, thus tending to remove the element of "fisherman's luck" and increasing the value of the catch by reducing unnecessary expense.

One of the most important undertakings of the council is that of coordinating the collection and dissemination of fishery statistics regarding the locality of capture and the quantities taken of the important species of fish in the North Atlantic in which the nationals of each country are interested. Revised charts were adopted by the council defining statistical areas of the North Atlantic region, to be used as a basis of a uniform statistical system among the several countries.

The council approved the following resolution:

Whereas much of the value of fishery investigations depends upon continuity of records over a period of years; and

Whereas the present program of fishery investigations is proving to be invaluable in determining governmental policies with respect to our highly important sea fisheries: Therefore be it

Resolved, That the council extend a vote of appreciation to the Woods Hole Oceanographic Institution for loaning the use of its vessel to the United States Bureau of Fisheries for continuing high-sea investigations for the current year, and that it urge the importance of provisions being made by the United States Congress to supply the funds necessary for the continuance of that work during the next fiscal year by the United States Bureau of Fisheries.

CONSERVATION OF WHALES

The Multilateral Convention for the Regulation of Whaling agreed to by the economic committee of the council of the League of Nations on September 24, 1931, has now been ratified by the following nations: United States, July 7, 1932; Norway, July 18, 1932; Union of South Africa, January 11, 1933; Switzerland, February 16, 1933; and Mexico, March 13, 1933. In addition to these ratifications the following have signified adherence to the convention: Nicaragua on April 30, 1932; Sudan, April 13, 1932; Monaco, June 17, 1932; Brazil, November 21, 1932; and Egypt, January 25, 1933. There remains only the signature of the United Kingdom of Great Britain and Northern Ireland to make the convention effective.

The more recent intensive prosecution of the whale fishery and consequent need of adequate regulation is indicated by a world catch of 42,874 whales in 1930–31 as compared with 11,369 in 1920; and a total production of whale oil in 1931 amounting to 184,348,800 gallons as compared with 20,366,350 gallons in 1920.

HALIBUT INVESTIGATIONS

The investigations of the International Fisheries Commission provided for under the convention between the United States and Great Britain concluded May 9, 1930, have been continued in accord with the duties prescribed by articles I and III of the treaty.

A practical demonstration has been successfully concluded during the past year as to the feasibility and effectiveness of international regulation of a deep-sea fishery when based upon adequate biological and statistical knowledge. Regulations of the commission in con-

junction with certain economic conditions have already had a most salutary effect on the stock of halibut. The long continued decline in abundance to the low level of 1930 has been halted, and on the more severely depleted southern grounds the recovery in 1933 has been to 50 percent above that of 1930. It is essential that the ground gained so far be maintained and the spawning reserve rehabilitated to the end that the fishery may become a stable resource with permanent yield.

Collection of comprehensive statistical and biological data by the commission for the past 8 years has been continued, and its analysis has revealed certain fundamental short-time reactions of the supply to the demands put upon it by the fishery. These reactions appear adequate to explain what has happened during the last 8 years. Hence it may now be possible to predict with a degree of accuracy what the immediate effect of regulation may be upon the stock.

The biological work has consisted chiefly in the analysis of data previously collected, as field work was of necessity curtailed on account of reduced appropriations. The preparation of reports upon studies of the rate of growth, maturity, fecundity, migrations, and biological statistics has engaged the scientific staff.

The limited field work conducted resulted in definite progress being made in the development of methods of determining the success of spawning by means of quantitative net hauls during 2½ months of charter of the United States halibut vessel *Eagle* in the Gulf of Alaska. The study of the migration and rate of decimation by the fishery of the few remaining spawning schools on the southern grounds was begun by conducting a tagging experiment off Cape St. James on the chartered Canadian halibut boat *Capella I* for 3 weeks, along the lines of the experiments of 1925 and 1926, already reported upon. A system of market measurements has been inaugurated to supplement size composition data secured from trade sizes.

The practicability of the commission's regulations involving division of the convention waters into areas, limiting the catch from each area, licensing of vessels for the halibut fishery, collection of statistics of abundance and locality of capture, modification of the closed season, and closing of nursery grounds has been satisfactorily proved during the past year. After public hearings during November 1932 several changes resulting from suggestions by the industry and findings of the scientific staff were made for the 1933 season, including changes in the dates of the closed season and in the boundary lines between regulatory areas. The well-known spawning grounds off Yakutat Bay were closed to fishing from November 1 to the end of February and provision was made for the prohibition of the use of dory gear in southern areas. The catches in the two principal areas were fixed at the same amounts as in the previous year, taking into consideration the change in boundary lines. These regulations were approved by the President of the United States and the Governor General of Canada and became effective on January 9, 1933.

JAPANESE VESSELS IN BERING SEA

The canning of spider crabs in Bering Sea was carried on in 1932 by Japanese interests as in the preceding 2 years. The floating

cannery *Nagato Maru* operated in the region between Amak Island and Port Moller, well outside the territorial waters of Alaska, for a period of about 4 months, during which a reported total pack of 33,000 standard cases of canned crab meat was prepared. Two auxiliary motor vessels, the *Kasuga Maru* and the *Ise Maru*, accompanied the cannery ship, and fishing was carried on from 10 small boats. The *Nagato Maru* carried a crew of about 45 men, and approximately 400 persons were employed in fishing and canning operations. The supply ship *Seiten Maru* visited the vessel once during the season to deliver supplies and take aboard a cargo of canned crab for transportation to Japan.

Early in the spring of 1933 the Japanese cannery vessels *Taihoku Mara* and *Shoheo Mara* arrived in Bering Sea to engage in crab fishing in offshore waters. A third cannery ship, the *Kasada Maru*, arrived later and was reported to be engaged in crab canning near the other vessels.

DOMESTIC RELATIONS

COOPERATION WITH STATES AND OTHER AGENCIES

Dwindling revenues for fisheries work in the States, together with curtailment of the Bureau's appropriation, rendered even more valuable and essential a broad program of cooperation and mutual aid between agencies concerned with the same activities.

In connection with the propagation and distribution of fish, mutually reciprocal relations have been established with 21 different States, enabling the State waters to be stocked more effectively and economically. These measures of cooperation have extended into practically all fields of fish-cultural work, including the exchange of eggs, joint use of hatchery facilities, distribution by the States of fish produced in Federal hatcheries, loan of experienced personnel to help the States, financial assistance on the part of the States in some instances, and loan of equipment. In addition the Bureau has directly aided 6 other States by supplying eggs, fish, or other services.

Uniformly helpful contact has existed with other Federal agencies concerned with the perpetuation of fish life, principally with the Forest Service, Bureau of Biological Survey, and the National Park Service.

The maintenance of active cooperation with sportsmen's organizations for the purpose of operating rearing pools and nursery ponds was on a more restricted scale. Approximately 100 organizations received fish for rearing from the Bureau's hatcheries in comparison with 116 last year. Consequently the fish allotted dropped considerably below the 4 million mark which was exceeded during the previous year. The State of Pennsylvania assisted materially by furnishing 475,000 brook trout for the nurseries within that State. The Bureau has endeavored to assist sportsmen's groups otherwise by rendering advice on fish-cultural problems, making inspections where practicable, and any other feasible means.

In the collection of fishery statistics unusual cooperation has been accorded the Bureau by the Pacific Coast and Great Lakes States, and also Maryland and Virginia. In addition, various other States have supplied statistics on one or more of the fisheries conducted within their borders. In this work the Bureau represents the cor-

relating agency, performing necessary service beyond the scope of any one individual State.

The technological work of the Bureau has been aided materially by cooperation with other agencies. At the South Carolina Food Research Commission one of the Bureau's technologists studied the nutritive value of fishery products, with special attention being given to oysters from all sections of the country. In the feeding of fishery products to farm animals, the Bureau also cooperated with the Ohio State Agricultural Experiment Station, Wooster, Ohio; the North Carolina State Agricultural Experiment Station, Raleigh, N.C.; and the New York State Agricultural Experiment Station, Cornell University, Ithaca, N.Y. The nutritive value of kelp meal was studied in cooperation with the United States Department of Agriculture and producers of kelp meal. The preservation of cordage was studied in cooperation with the Navy Department at Boston. A portion of the Bureau's study of the preservation of textile fishing gear and twine was conducted in cooperation with the Weather Bureau, the Bureau of Standards, and various individual fishermen at various fishing centers. A study on the measurement of the size of mesh used in gill nets in the Great Lakes was aided by the Bureau of Standards and various States and certain Provinces of Canada bordering the Great Lakes. A study of the manufacture of salmon oil was begun in the vicinity of Seattle, with assistance from the salmon branch of the National Canners Association in Seattle. At Gloucester, Mass., the local fishing industry is making material contributions to the maintenance of the Bureau's technological laboratory located in that city by providing the building for the laboratory without cost to the Government. Members of the staff of the Massachusetts Agricultural College, Amherst, Mass., have aided the Bureau in developing programs for bacteriological studies of fishery products, and for the home canning of fishery products.

A market study was made of the fishing industry in Florida in cooperation with the State Marketing Bureau, and various individuals and companies in the State. In its marketing work the Bureau also cooperated with the State of Virginia, establishing marketing grades for certain fishery products in that State.

The biological investigations of the Bureau were aided by the cooperation of several States that provided funds, personnel, and equipment for projects in their territory. The State of New York continued the joint nutrition studies on trout at Cortland in cooperation with the College of Agriculture, Cornell University, and the enlarged program of pond-culture work at Rochester. Michigan and Wisconsin cooperated financially in the study of conservation of food fishes through the use of improved fishing gear. Georgia, Louisiana, and Texas continued their assistance with personnel and other contributions to the shrimp investigations. The oyster cultural research program in the South Atlantic and Gulf States has been aided by the help of North and South Carolina, Georgia, and Florida. California provided all the field expenses of the trout and oyster investigations. Mississippi assumed the expense of a survey of the fisheries in that State. The Bureau is continuing its oyster research in Connecticut with the laboratory and vessel put at its disposal by the State, and similar facilties are available in Puget

Sound through the cooperation of the State of Washington. The hydrographic program of the Bureau's North Atlantic investigation was enabled to be continued through the generous cooperation of the Woods Hole Oceanographic Institution in assigning its vessel *Atlantis* to continue the work threatened with disruption when the Bureau's vessel *Albatross II* was laid up for lack of funds.

CONSTRUCTION PROGRAM

No appropriation was made during 1933 to carry on the construction authorized by the act of May 21, 1930 (46 Stat. 371). However, the unexpended balances for certain projects carried in an appropriation of $448,500 for the previous year were continued. This permitted the completion to the limits of authorization of new hatcheries already started at Lake Mills, Wis.; Ennis, Mont.; Hagerman, Idaho; Crystal Lake, Colo.; Flintville, Tenn.; and Butte Falls, Oreg. The first three of these did not enter into production during 1933, however. In addition considerable preliminary development was accomplished at Marion, Ala., where a large and desirable site was acquired. Two hatcheries, previously operated under lease, at Mill Creek, Calif., and Cortland, N.Y., were acquired by purchase and improvements were effected. A reduction of 10 percent in the amount of all building authorizations imposed by Congress as an economy measure rendered it impossible to complete several of the new stations.

The Government now holds title to sites in Indiana and Pennsylvania, which will be developed through funds obtained from the Emergency Public Works program. Under authority of the Bureau's 5-year program a site was acquired gratis at Bear Lake, Utah, and developed as a trout-rearing unit. The new hatchery at Mount Rainier National Park, mentioned in last year's report, was completed and placed in operation. A trout-rearing establishment was also developed in Jackson Hole, Wyo., adjacent to Yellowstone Park. This is intended to serve the new Teton National Park.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

The Federal fish-hatchery system operated by the Division of Fish Culture was successful in increasing its output of fish and eggs for the fiscal year to a total of over 7,202,155,000. This is an increase in production of 2 percent over the previous year. Fewer species were handled than in the previous year, but 18 out of more than 40 species propagated were produced in increased numbers. Five new hatcheries, located at Crystal Lake, Colo., Flintville, Tenn., Marion, Ala., Lake Mills, Wis., and Butte Falls, Oreg., entered into production for the first time. The size of the fish distributed, as well as their numbers, has an important bearing on the value of the work, since the survival of the planted stock is correlated with the size and age at planting. The larger fish, many of legal size, particularly among the game varieties, are termed fingerlings, and a distribution of over 182,338,000 in this category represents an increase of 22.7 percent over the previous year. Included in the figures for hatchery output are the figures covering the rescuing and salvaging of fishes in the overflowed area of the upper Mississippi River.

While the methods of operation largely followed those of past years, all worth-while developments and improvements in the way of fish-cultural technique, apparatus, equipment, etc., were given a trial and adopted where proved practical. Over 80 stations, substations, and egg-collecting units, practically the same number as in the previous year, were operated. There were several changes, however, owing to the closure of operations at several points and the opening of new stations at other locations.

PROPAGATION OF COMMERCIAL SPECIES

Marine species, Atlantic coast.—Inasmuch as the eggs of the cod, haddock, and flounder are easily secured in tremendous numbers, this group accounts for 86.7 percent of the total output of the commercial group. They are propagated at only three stations, all located in New England. Both the cod and the flounder show a marked increase in output; but smaller numbers of haddock, pollock, and mackerel were released in comparison with the output of the previous year.

Pacific salmons.—The only increase registered in this group was for the chum and sockeye salmon, the species of least and highest value. The Yes Bay (Alaska) station succeeded in raising approximately 15 million sockeyes to the large fingerling size, in contrast with the usual practice of releasing them at an early stage.

Anadromous species, Atlantic coast.—These include the species other than Pacific salmon which migrate from salt water to fresh water for spawning. The shad and glut herring comprise the greater proportion under this category and were produced in somewhat lesser quantities, because of weather conditions affecting the spawning runs. There was a slight decline in the output of Atlantic salmon, partially offset by an increase in the size of the fish planted. No striped bass were propagated in 1933.

Commercial species, interior waters.—A number of hatcheries on the Great Lakes and elsewhere propagated whitefish, lake trout, lake herring (ciscoes), and pike perch. They also handled carp, yellow perch, etc., during the off season for the other species. The only variety propagated in larger numbers during 1933 was the whitefish. A practically complete failure of the egg supply at the Cape Vincent (N.Y.) station, together with the closure of certain commercial fishing grounds in Lake Superior, limited the collection of lake-trout eggs. Reduced egg collections and the failure to operate a hatchery on Lake Champlain accounted for a reduction in the number of pike perch handled. No special effort was made to obtain a large output of carp and buffalofish. Suckers, formerly hatched in cooperation with the State of Pennsylvania, were not handled.

PROPAGATION OF GAME FISHES

Game fishes, while commonly considered as a recreational asset, are a distinctive economic resource as well, since they are the basis of livelihood for a large number of individuals who in one way or another cater to the angler. Consequently, the enlargement of fish-cultural facilities, both Federal and State, has been mainly for the

purpose of increasing the output of game fish. The Bureau's efforts in this direction in 1933 resulted in an increased output for three species of trout, for grayling, and for practically all forms of the pond fish or pan fish. It is particularly gratifying to report an output of almost 5¼ million largemouth and smallmouth black bass. The popularity of this fish is responsible for a heavy demand. In fact the demand for all species of game fish, as shown by the number of applications, has undergone no abatement. In addition, special effort has been made to increase the planting of fish in the public domain, particularly national forests and national parks. The supply of trout eggs obtained from wild fish or from station brood stock was adequate for all requirements, no eggs being acquired by direct purchase. The practice of distributing fish by truck was expanded, although the increased output required the full use of four distribution cars. It is desirable to emphasize that many of the species listed as commercial varieties—for example, the lake trout, pike perch, steelhead salmon, etc.—are eagerly sought by the sportsmen, and the actual replenishment of sport fishing is greater than is indicated in the relatively small percentage listed as the output of strictly game fishes.

RESCUE OPERATIONS

Rescue or salvage operations on the upper Mississippi River, chiefly within the confines of the Upper Mississippi Wild Life and Fish Refuge, covered the handling of over 72,180,000 fish, an increase of 20,569,000 over last year. In addition a considerable production of bass and other species was obtained from seminatural controlled ponds, operated as auxiliary hatching ponds within the refuge. As usual approximately 1 percent of the rescued fish were distributed to other than parental waters.

AQUARIUM

The aquarium, maintained in the basement of the Department of Commerce Building, was a focus of increasing public interest. Approximately 1,000 specimens of 57 different species of native and tropical fish were on display during the year, together with 10 species of aquatic reptiles, crustacea, etc. Hatching apparatus was installed to demonstrate the incubation of eggs of trout, salmon, shad, whitefish, pike perch, and yellow perch. A model fish ladder was also shown. Several rare and unusual forms, such as the Alaska blackfish and Eastern golden trout, were added to the collection.

STATISTICAL INVESTIGATIONS

FISHERIES OF THE UNITED STATES, 1931

New England States.—During 1931 the fisheries of Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut, employed 17,900 fishermen, or an increase of 5 percent over 1930. The catch amounted to 540,298,000 pounds, valued at $20,141,000—a decrease of 23 percent in the catch and 27 percent in the value as compared with 1930. Landings of fish by American fishing vessels at Boston and Gloucester, Mass., and Portland, Maine, amounted to 263,685,000

pounds as landed, valued at $9,249,000—a decrease of 25 percent in quantity and 28 percent in value from 1930.

Middle Atlantic States.—The fisheries of New York, New Jersey, Pennsylvania, and Delaware in 1931 employed 9,600 fishermen or 5 percent less than in 1930. The catch amounted to 164,899,000 pounds, valued at $9,211,000—a decrease of 15 percent in the catch and 29 percent in its value under 1930. Landings of fish at New York City and Groton, Conn., amounted to 51,854,000 pounds or 9 percent less than in 1930. On the Hudson River the shad fishery was carried on by 250 fishermen who caught 414,000 pounds of shad, valued at $49,800—a large increase over 1930.

Chesapeake Bay States.—In the calendar year 1931 the fisheries of Maryland and Virginia employed 20,700 fishermen or 7 percent more than in 1930. The catch amounted to 293,271,000 pounds, valued at $7,428,000—a decrease of 7 percent in the catch and 35 percent in its value as compared with the previous year. The shad and alewife fisheries of the Potomac River were prosecuted by 680 fishermen who caught 2,061,000 pounds of shad, valued at $193,000, and 7,352,000 pounds of alewives, valued at $55,500—a large increase over the previous year.

South Atlantic and Gulf States.—During 1931 the fisheries of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas, employed 23,700 fishermen or 1 percent more than in 1930. The catch amounted to 289,309,000 pounds, valued at $8,082,000—a decrease of 31 percent in the catch and 27 percent in its value as compared with the previous year.

Pacific Coast States.—The fisheries of Washington, Oregon, and California in 1931 employed 19,200 fishermen or 2 percent less than in 1930. The catch amounted to 597,306,000 pounds, valued at $13,512,000, a decrease of 28 percent in the catch and 41 percent in its value as compared with 1930. The total catch of halibut by United States and Canadian vessels amounted to 42,845,000 pounds, valued at $2,842,000, a decrease of 13 percent in quantity and 43 percent in value as compared with 1930.

Lake States.—During the calendar year 1931 the Lake fisheries (Lakes Ontario, Erie, Huron, Michigan, Superior, Namakan, and Rainy Lakes, and Lake of the Woods of the United States and Canada) produced 120,832,000 pounds of fish and shellfish. Of the total the United States accounted for 91,927,000 pounds, valued at $6,029,000, a decrease of 3 percent in quantity and less than one half of 1 percent in the value of the United States catch as compared with the previous year.

Mississippi River and tributaries.—During 1931 the fisheries of the Mississippi River and tributaries employed 15,900 fishermen, or 29 percent more than in 1922, when the first previous survey was made. The catch amounted to 82,382,000 pounds, valued at $2,897,000, a decrease of 22 percent in the catch and 36 percent in its value as compared with the previous survey.

MANUFACTURED PRODUCTS IN THE UNITED STATES AND ALASKA, 1931

The total value of manufactured fishery products of the United States and Alaska in 1931 amounted to about $128,000,000.

Fresh and frozen packaged products.—The production of fresh and frozen packaged fish and shellfish in 1931 amounted to 139,283,000

pounds, valued at $23,076,000, a decrease of 11 percent in quantity and 20 percent in value as compared with 1930. Important items in this group were fresh-shucked oysters, amounting to 5,438,000 gallons, valued at $8,372,000, and fresh and frozen haddock fillets, 42,014,000 pounds, valued at $6,109,000.

Frozen products.—The pack of frozen fishery products in 1931 amounted to 112,257,000 pounds which had an estimated value of $11,000,000. The volume of the pack was 19 percent less than in 1930. The more important products with respect to volume were halibut, salmon, haddock fillets, mackerel, and whiting.

Cured products.—During 1931 the output of cured fishery products (salted, spiced, smoked, and dried) amounted to 98,969,000 pounds, valued at $12,364,000—a decrease of 21 percent in quantity and 27 percent in value as compared with 1930. Important products were mild-cured salmon, 10,160,000 pounds, valued at $1,550,000; smoked salmon (produced from mild-cured salmon), 7,788,000 pounds, valued at $2,270,000; and boneless cod, 12,205,000 pounds, valued at $1,047,000.

Canned products.—Canned fishery products produced in 1931 amounted to 506,702,000 pounds, valued at $62,940,000—a decrease of 12 percent in quantity and 24 percent in value as compared with 1930. Canned salmon, amounting to 6,740,000 standard cases (323,522,000 pounds), valued at $38,083,000, was most important. Other important products were sardines, tuna and tunalike fishes, shrimp, clam products, and oysters.

Byproducts.—During 1931 the production of fishery byproducts amounted to $18,538,000, which was a considerable decrease from 1930. Important products in this group were marine-animal meals and scrap, aquatic shell products, and marine-animal oils.

MARKET INVESTIGATIONS

Aquatic shell products.—A survey of the oyster, marine clam, fresh-water mussel, and marine pearl shell industries, which in 1932 produced products valued at nearly $8,000,000, revealed the sources of raw material and methods for its production and manufacture into useful commodities, as well as practices followed in distributing the finished product.

Fishery byproducts industries of Maine.—A technical survey of the manufacture and marketing of fishery byproducts in Maine showed that present factories have ample facilities for the greater utilization of existing waste; that fish meals produced in Maine are not reaching markets that their good quality justifies; and that methods for producing fish oils could be improved.

Establishing marketing grades for fish.—Considerable confusion and disorder exist in the marketing of some fish because of the lack of uniform grades. Believing that this could be overcome in Virginia, authorities of this State requested the Bureau's assistance in establishing marketing grades for fish in their State. This invitation was accepted and after conferences by representatives of the Bureau and the Division of Markets of the Virginia State Department of Agriculture with fishermen, wholesalers, retailers, and others, a system was developed and established for grading various fish and fishery

products. The system was put into effect immediately in the State and has proved satisfactory in the more orderly marketing of these products with benefit to both sellers and buyers.

The red-snapper fishery and industry.—During 1932 a study of the red-snapper fishery and industry revealed that costs of producing red snapper might be lowered by the use of a fish pot which was shown to be very efficient for catching this fish. Also it was found that marketing conditions might be improved by more careful handling of the catch aboard vessel to retard deterioration, and by diversifying the type of red-snapper product offered for sale. In the latter connection, experiments showed that red snapper lends itself to smoking in the "finnan haddie" style.

TECHNOLOGICAL INVESTIGATIONS

Nutritive value of marine products.—In cooperation with and in the laboratories of the South Carolina Food Research Commission, Charleston, S.C., the Bureau's technologist completed an investigation in which oysters from different localities were analyzed for their iron, copper, and manganese content, and the dried oysters fed to anemic rats. All samples, regardless of locality from which they were obtained, induced regeneration of hemoglobin, thus giving evidence of the importance of oysters as a source of iron in addition to their other food factors.

Studies on the vitamin potency of salmon-liver oils have revealed that they are from 10 to 12 times as potent in vitamin A as salmon oil from general cannery trimmings. However, since the yield of oil from salmon livers is low and since it requires solvent extraction to obtain the oil from the livers, it is expected that adjustments will need to be effected before placing the manufacture of salmon-liver oil on a commercial basis.

Further work in cooperation with a producer of kelp meal has shown that kelp meal is a valuable supplement to rations composed of vegetable feedstuffs in which the protein is supplied by plant protein concentrates.

Preservation of fishery products for food.—Studies on the chemical and physical changes of fresh fish and frozen fish held in cold storage have shown that with improved methods the producers can offer to the public a product superior to those handled by the ordinary commercial procedure. These studies have dealt in detail with the rate of freezing, the temperature of cold storage at which the least change takes place in texture of the flesh, and the rate of change to be expected from fresh fish packed by the usual method in ice. An electrometric method for the determination of the relative freshness of fish flesh also has been developed, which may be of great value in grading fish for quality. Practical experiments in the home preservation of fish by salting and smoking were made before county agents, home economics experts, fishermen, and housewives, at various points along the South Atlantic and Gulf coasts. This work has shown that the outlets for fish can be expanded when consumers are acquainted with methods for preserving fish in rather large quantities for family use.

Bacteriology of fish preservation.—In a study of the bactericidal effect of smoke and salt brining on fish, it has been found that

contrary to the general belief neither smoke nor salt brine has a preservative effect on fish so preserved in ordinary commercial practice. In this work the technologists have been able to produce a smoked haddock containing a higher percentage of water than is ordinarily found in this product, which has retarded losses in this process; but to date a successful method has not been found for preserving smoked fish for a greater length of time at the usual room temperatures. Studies have been made of the bacterial spoilage of frozen fish and of fish packed in ice, and considerable progress has been made in developing methods for retarding or overcoming this spoilage which are an improvement over usual practice.

Preservation of fishery byproducts.—Researches in this field have shown where economies can be effected in the manufacture of fish meal to produce a more nutritious product, and have given fundamental information concerning the effect of manufacturing methods on the factors controlling the nutritive value of the product.

Studies of the manufacture of fish flour are still in the development stage, being concerned mainly with the study of methods for atomizing macerated fish waste in a heating medium in order to effect extremely rapid drying.

Research in the chemical and physical constants of haddock-liver oil have shown that while crude haddock-liver oil may be expected to come within the United States Pharmacopœia limits, the cold pressed oil may be expected to exceed the limit occasionally. The significance of this is confused somewhat by the lower vitamin potency of the oil. This research also has shown that the colorimetric method for determining vitamin A offers oil manufacturers a rapid and inexpensive estimation of the quality of the various lots of oil prepared.

Net preservation.—For several years this Bureau has been endeavoring to reduce depreciation and consequent cost of maintaining fish nets by developing net preservatives and encouraging improved handling of the nets. In 1932 the efficacy of covering dyed heavy webbing with a specification tar as previously recommended was confirmed. Chemicals also have been found which retard weed growth on fishing nets, and others which are efficacious antioxidants. Tests also confirmed previous recommendation of the Bureau for cleaning the net and drying in the shade to reduce deterioration. In this connection it has been found that washing nets with lime water appears to treble their life. Some preservative principles developed in this research may have application to the preservation of other textile materials, such as sails, awnings, and rope.

BIOLOGICAL FISHERY INVESTIGATIONS

All of the most essential major projects of research comprising the investigative program of the Division of Scientific Inquiry, developed through many years of careful planning and organization, have been continued during the past year with only moderate curtailment because of reduced appropriations.

Investigations of the commercial fisheries are concerned with the changes in abundance of the food fishes of the North and Middle Atlantic areas and with the correction of abuses in the commercial

fisheries of the Great Lakes. The shrimp fishery of the South Atlantic and Gulf has also been studied with the aim of discovering and preventing depletion of the supply; and the salmon and herring fisheries of Alaska are undergoing scientific analysis as a basis for their regulation. Aquicultural investigations include studies on the improvement of hatchery technique for both cold- and warm-water fishes and the planning of rational stocking policies in interior waters. Shellfishery investigations have been directed toward improving the quality of the oysters in the North and Middle Atlantic section and toward increasing the production by cultural methods in the South and on the Pacific coast. Even with reduced appropriations for field operations the Bureau's technical staff has made valuable contributions to science, all of which have practical application to the welfare of the fishery industries, to the angler, and to the water farmer, assuring continued productiveness of the natural supply and increased production and improved quality of cultivated aquatic products.

FISHERY INVESTIGATIONS OF THE ATLANTIC AND GULF COASTS

Fishery investigations have been concerned with the haddock and mackerel in the New England section; with the squeteague or weakfish, the butterfish, scup, and flounders in the Middle Atlantic section; and with the great shrimp fishery in the South Atlantic area. Investigations on shellfish in these areas will be considered later.

The haddock fishery, which is the most important on the Atlantic coast, reached a maximum production in 1927 and has fallen off sharply in succeeding years until a minimum was reached in 1931 of less than 183 million pounds. The maximum yields around 1927 were the result of unusually successful spawning during the years 1920 and 1922. A study of the statistics of the yield per unit of effort, combined with a study of the biology of the haddock stock, particularly size and age composition, growth rate and distribution, indicate that since these years no abundant year broods were produced until 1930. It was anticipated that when this abundant year class reached marketable size there would be an increase in landings. During the spring of 1933 catches by the trawling fleet have been extremely good, but prices have declined in the meantime so that only moderate production in the fishery has resulted.

Reduced funds have prevented the conduct of studies on the abundance of year classes below commercial size. Tagging experiments to trace the migrations of the haddock have also been reduced, but determination of migrations is essential to an accurate prediction of the trend of the fishery on Georges Bank, and this study will be resumed at the earliest opportunity.

The regular spring prediction of the mackerel fishery for 1933 was issued by the Bureau near the beginning of the season. At that time it appeared that a catch of about 44 million pounds was in prospect. Economic conditions, however, will prevent the fleet from realizing this yield, although the catches during the early part of the season indicate an abundance somewhat in excess of that of the previous year. Difficulties in compiling 1933 estimates of the mackerel fishery emphasize the need for a more thorough

understanding of the causes of rapid declines in the apparent abundance of certain year classes contrasted with the gradual declines in others. The situation urgently calls for tagging experiments to determine the commercial drain on the yearling mackerel. Such determination of the strain on the stock would not only render a prediction more certain but would also yield important evidence as to whether beneficial effects would attend a restriction of fishing on these younger mackerel.

When investigations of the shore fisheries of the Middle Atlantic States were begun in 1927, statistics of the yield presented the gloomy picture of declining yields of several important food and game fishes amounting in comparison with 1921 to 72 percent for bluefish, 21 percent for croakers, 37 percent for scup, and 36 percent for squeteague. Studies have been pursued to discover the causes of these observed declines and to formulate recommendations for the restoration and preservation of the resource. Most recent canvasses show a substantial recovery from the low yield of squeteague of 1926, particularly in New Jersey. Investigations have shown that this recovery was brought about by the appearance of large numbers of fish of the 1926 and 1927 year classes. The yield of butterfish has recovered to near record levels during the course of the investigations. In view of the fact that a complete natural recovery has occurred and that there is no prospect of a material increase in the fishing intensity of the future, regulation or restriction of this fishery is not recommended.

The yield of scup has likewise recovered naturally to very high levels. The development of a year-round trawl fishery during the past three years has increased the strain on this stock, however, and particular attention is being paid to a study of this fishery which is prosecuted off the Virginia capes during the winter seasons.

During the past spring a preliminary report on the life history of the most important commercial species of shrimp in the South Atlantic and Gulf areas was approved for publication by the Bureau. Field investigations in cooperation with the States of Georgia, Louisiana, and Texas have been conducted throughout the year and recently operations on the Atlantic coast have been extended from Georgia waters to include the shrimping areas of South Carolina and Florida. A study of the life history and migrations of the commercial shrimp has revealed the surprising and significant facts that this species spawns principally in the open ocean and Gulf, grows rapidly in the inshore waters of bays and estuaries, migrates seaward again where the life cycle is completed within a year by spawning and subsequent death. Hence, conservation measures must be applied promptly as soon as depletion is indicated in order to avoid serious consequences.

Ichthyological studies in the South Atlantic and Gulf areas have been concerned with an examination of the fish fauna of the Gulf coast, which have resulted in extensive revision in the taxonomy of such species as the various flounders, gobies, and others, and a study of the fishery resources in streams and lakes in the State of Mississippi. This latter survey, conducted in cooperation with the State authorities, is an effort of the newly formed fish and game commission to assess the fishery possibilities of the State as a basis for more effective conservation laws.

FISHERY INVESTIGATIONS IN INTERIOR WATERS

Investigations have been conducted on Lakes Michigan and Huron in the interest of overcoming wasteful and destructive practices of the commercial fisheries, which are responsible to a large degree for the depletion of the more valuable food fishes. An investigation conducted from a number of Michigan ports on the effects of deep trap nets was completed early in the fiscal year, indicating a considerable increase in the use of these nets for catching whitefish, and a wholesale transfer of these nets from certain fishing grounds long famous for their whitefish production to new grounds on account of the depletion of the supply on the former grounds. Illegal-sized fish are most numerous in deep water, hence recommendations have been offered limiting these nets to waters less than 80 feet deep and requiring an increase in the meshes of the lifting pots to permit the escape of undersized fish.

In Lake Michigan special attention has been given to the effect of chub nets fished on grounds where small lake trout are numerous. It was found that chubs and trout were more abundant in Michigan waters where gill nets with larger meshes are employed than in Wisconsin waters. Recommendations were proposed therefore for legislation to prohibit or curb the sale of immature lake trout and to provide for an increase in the mesh of nets to protect undersized chubs from unnecessary destruction. The Bureau also cooperated with the Wisconsin Geological and Natural History Survey in a series of limnological and fishery studies in the smaller lakes of northeastern Wisconsin.

At the close of the fiscal year a manuscript was completed on limnological investigations in western Lake Erie, which were conducted during the years 1926 to 1930 in cooperation with various State conservation departments and scientific institutions. This report correlates the technical studies of a number of collaborators and presents for the first time in assembled form a great mass of biological and physical data of fundamental importance to the conservation of the fisheries of the lake. It concludes that pollution, long suspected of adversely affecting the fisheries, is not responsible for the continued decline of the more important species.

FISHERY INVESTIGATIONS OF THE PACIFIC COAST AND ALASKA

The Bureau's investigators continued biological observations on the runs of red salmon in Bristol Bay and the Karluk, Copper, and Chignik Rivers in Alaska, in order to safeguard properly the salmon fishery resources of the Territory and to comply with the White Act of 1924. In addition, a study of the age composition of the runs and an enumeration of the spawning fish passing weirs on their way to head-water streams for propagation was made. The final section covering southeastern Alaska of the analysis of statistics of the salmon fisheries has been submitted for publication.

Heretofore little information has been available regarding the biology of the important runs of pink salmon in Alaska. An investigation has revealed that this species possesses a distinct homing

instinct similar to that of the red salmon returning for spawning with few exceptions to the streams in which the fish were hatched. The life cycle has definitely been establised as 2 years and further investigations regarding the biological factors responsible for fluctuations in time of appearance and abundance of the runs have progressed sufficiently to have practical application in devising regulations for the upbuilding and maintenance of the supply.

As a means of ascertaining more effectively the segregation of independent races of herring in Alaska, each of which is subject to overfishing without affecting neighboring supplies, a new method of tagging has been perfected for a study of their migrations. The method is unique in fisheries science inasmuch as electromagnets are utilized to recover metal tags in the factories in the process of manufacturing fish meal. Further studies of fluctuations in abundance from year to year demonstrate the effect of year class dominance as a cause of changing yields and indicate the necessity for regulation of the fishery in times of reduced supplies.

A study of the sockeye-salmon fishery in Puget Sound, undertaken during 1931, has shown that severe overfishing virtually destroys the big runs of salmon that occur every 4 years in the Frazier River system. Since this river supports the most valuable salmon fisheries in the State of Washington, efforts will be made to regulate the fishery so as to restore it to its former abundance.

FISH SCREEN AND LADDER INVESTIGATIONS

Investigations of methods of conserving the runs of anadromous fish on the Pacific coast by means of screens and ladders have been completed. Revolving mechanical screens have been found to be most effective and under certain circumstances electric screens have also proved their efficiency. Recommendations and perfected designs have been made for a large number of irrigation works in Washington, Oregon, Idaho, Utah, and Nevada, and recommendations for fish protective works at hydroelectric developments have been made to the Federal Power Commission.

AQUICULTURAL INVESTIGATIONS

Practical results of the Bureau's investigations in the interest of improved fish-cultural practices have been evidenced by a sustained output of large and vigorous fish from the Bureau's many hatcheries in the face of reduced appropriations. Studies conducted at the three experimental hatcheries have shown the feasibility of extensive utilization of cheaper ingredients in the diet of trout and the utility of fertilizers and forage fish in the economical production of bass and other warm-water fish. Trout breeding experiments have likewise demonstrated the superiority of selected strains of brood fish over wild stock in increased egg production, in more rapid growth, and in resistance to disease. It has been shown that hatchery production can be increased four times by doubling the rate of growth and the number of progeny from a single pair through selection of the brood stock. Progress has been made in solving the problems

of sanitation and prophylaxis against disease in hatcheries and in disseminating such information for practical application in fish hatcheries.

Cooperative investigations of the nutritional requirements of trout carried on jointly by the New York Conservation Department, Cornell University, and the Bureau of Fisheries at Cortland, N.Y., have progressed satisfactorily where synthetic diets have been employed in testing the vitamin requirements of trout and their ability to digest the various food materials.

Cooperative trout investigations in the State of California, because of the liberal support afforded by that State, have been continued without curtailment. Ecological studies of the coastal streams and of those in the high Sierras have been undertaken on a large scale to determine the capacity of various waters in sustaining fish life in relation to the food supply, the physical characteristics of the streams, and the drain upon the supply by the fishery as a basis for adequate stocking.

FISHERY STUDIES IN NATIONAL PARKS AND FORESTS

As a means of more fully discharging the responsibility of the Federal Government in maintaining the fish supply in the public domain, a survey of streams and lakes in Glacier National Park was completed during the year for the purpose of formulating a stocking policy to be followed in the future. Extensive collections and observations were made and analyzed for the purpose of determining the fish population and the available natural food present as factors in the carrying capacities of various streams. Assistance has been rendered various State fish and game departments in the inter-mountain region in solving particular problems regarding the stocking of fish in State waters.

SHELLFISHERY INVESTIGATIONS

Investigations on the various problems of the oyster industry were carried out in the North Atlantic and South Atlantic States and on the Pacific coast. In the Northeastern States where previous work of the Bureau has materially aided in increasing the propagation of seed oysters, main effort was directed toward a study of methods of growing and fattening oysters for market and in improving the nutritive quality of the product. Detailed analyses of the glycogen content throughout the year have been made on oysters from the cooperative experimental farms maintained with the State of Connecticut at Milford. In the laboratory at Woods Hole, Mass., and in Washington studies on the growth of natural oyster food give promise of solving the problem of increasing the food value of oysters and standardizing their nutritive qualities. In the South Atlantic, where the depleted state of the natural oyster reefs is most apparent, principal attention was given to methods of restocking and maintaining the productivity of natural and cultivated bottoms. Experimental oyster farms have been maintained in each of the South Atlantic States and extensive surveys in the State of Florida have revealed new areas suitable for oyster culture. On the Pacific coast studies of spawning and improved methods of seed collection

are proving of practical value in the cultivation of the native Olympia oyster.

Experiments on the artificial cultivation of fresh water mussels, which provide the raw material for the American pearl-button industry, have been prosecuted with success. Large quantities of the valuable species have been grown in artificial raceways at the Bureau's station at Fort Worth, Tex., and methods for feeding mussels have been devised, which materially accelerate their normal growth.

POLLUTION STUDIES

Efforts during the past several years to stock depleted streams of the Mississippi drainage with fresh water mussels, produced by artificial propagation, have failed because of the increased pollution in these waters from industrial and domestic wastes and silt eroded from the surface of the land. The presence of great quantities of silt, which is rapidly increasing, moreover, jeopardizes the continued existence of all of the more valuable forms of aquatic life throughout the drainage. This problem has been given much study from the point of view of determining definitely the menace of silt pollution and the extent of polluted waters in the hope of finding areas suitable for restocking with the valuable mussel species.

A careful investigation of the physiological effects of toxic substances found as pollutants in rivers of the Middle West has been continued in cooperation with the University of Missouri. Studies on the effects of arsenic, cyanide, and various heavy metals and acid mine wastes have demonstrated the disastrous effects upon aquatic life of these substances in the streams. During the fall a detailed investigation in the field, supported by laboratory studies, on the effects of mine pollution in the Coeur d'Alene district of Idaho, demonstrated the serious effects upon fish and invertebrate aquatic life of washings from stamp mills and from mine drainage, and recommendations were offered to the State outlining means of overcoming this menace to an important natural resource.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

The general abundance of the fisheries of Alaska in 1932 may be attributed primarily to the conservation program that has been carried on since the law of June 6, 1924, gave the Secretary of Commerce broad powers to control commercial fishing. Careful surveys of the fisheries were made throughout the season, and the regulations were modified to meet changing conditions. The Commissioner of Fisheries spent several weeks in Alaska for personal observation of the salmon fisheries, which constitute the Territory's most important economic resource.

Revised fishery regulations were issued on December 20, 1932, and became effective January 1, 1933. The restrictions in several regions were relaxed by extending the fishing season or by opening closed waters to limited operations. Trap fishing was further curtailed

in places where such action was deemed necessary to secure the escapement required by law of not less than 50 percent of the salmon runs, and additional restrictions were placed on the taking of razor clams in order to prevent depletion of the beds.

A patrol of the fishing grounds was maintained to enforce the laws and regulations for the protection of the fisheries. Twelve statutory employees and 206 temporary stream guards and special workmen were identified with this work in 1932, in addition to the crews of 15 Bureau vessels and 8 chartered boats.

Attention was given to the improvement of salmon streams by removing obstructions that prevented the ascent of salmon to the spawning grounds, and by destroying predatory enemies of salmon. The latter work was carried on chiefly in connection with the operation of salmon-counting weirs in parts of central and western Alaska. At its 1933 session the Territorial Legislature again made an appropriation for this purpose, and it is planned that a considerable part of the amount available will be spent for bounty on predatory trout in the Bristol Bay region.

ALASKA SALMON HATCHERIES

At the Government hatcheries at Afognak and on McDonald Lake 44,651,800 red-salmon eggs were collected in 1932, as well as 3,082,500 pink-salmon eggs. Shipments of 3,011,000 red-salmon eggs and 2,608,000 pink-salmon eggs in the eyed stage were forwarded to Seattle in the fall. At the privately owned hatchery, operated under the provisions of the Alaska fisheries act of June 26, 1906, 25,895,000 red-salmon eggs were collected.

PRODUCTS OF THE FISHERIES

Notwithstanding the marked curtailment of fishing effort in the Alaska salmon industry in 1932, the total output of fishery products exceeded that of the previous year because of a substantial increase in the herring production and the resumption of operations by one of the whaling stations. Although there was an increase of 1 percent in the total yield of fishery products, as compared with that for 1931, the total value decreased about 25 percent.

Salmon products comprised about 77 percent in quantity and 90 percent in value of the total output of the Alaska fisheries in 1932. Ninety-four percent of the salmon production consisted of canned salmon, the pack amounting to 5,254,000 cases, or 252,215,000 pounds, valued at $21,716,000. As compared with the pack of the preceding year, the output of canned salmon in 1932 showed a decrease of 3 percent in quantity and 25 percent in value. The number of canneries operated dropped from 116 in 1931 to 87 in 1932.

The total output of Alaska fishery products in 1932 was 349,635,000 pounds, valued at $25,029,000, as compared with an average of 361,590,000 pounds, valued at $43,356,000, for the 5-year period from 1927 to 1931, inclusive. The value of the 1932 catch to the fishermen was approximately $6,971,000, or about $3,072,000 less than in the preceding year. There were 20,000 persons employed in the various branches of the industry, as against 22,500 in 1931.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

Fur-seal operations at the Pribilof Islands were handled by the staff of regular employees aided by the resident native population and approximately 50 natives imported from the Aleutian Islands region for work during the active sealing season.

As far as possible, killings of seals were confined to surplus 3-year-old males, although limited numbers of other age groups were taken. Of the season's take of skins, about 65 percent were blubbered at the islands before being cured. A computation of the number of animals in the herd was made at the close of the sealing season.

Construction activities were curtailed considerably because of the lack of funds, but there was some extension of improved roads and continuation of work on buildings that had been begun during the previous year. The East Landing wharf at St. Paul Island was completed and the construction of boatways alongside was begun.

The annual supplies for the Pribilof Islands were forwarded from Seattle on the U.S.S. *Sirius*, and the sealskins secured during the season were transported on the return voyage. Valuable assistance in maintaining a patrol for the protection of the fur seals and in performing other services was rendered by the United States Coast Guard.

SEAL HERD

The computed number of animals in the Pribilof Islands fur-seal herd on August 10, 1932, was 1,219,961, an increase of 92,879, or 8.24 percent, over the corresponding figure for 1931.

TAKE OF SEALSKINS

In the calendar year 1932 there were taken on the Pribilof Islands 49,336 fur-seal skins, of which 39,490 were from St. Paul Island and 9,846 from St. George Island. This was a decrease of 188 from the number taken in 1931.

MARKING RESERVED SEALS

Twelve hundred 3-year-old male seals on St. Paul Island and 1,809 on St. George Island, a total of 3,009, were marked and reserved for future breeding stock. The reserve includes also a large number of seals of this age class that were not taken in the drives.

SALE OF SEALSKINS

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis in the fiscal year 1933. On September 26, 1922, there were sold 15,521 black-dyed, 10,157 logwood brown-dyed, and 801 miscellaneous unhaired and raw-salted skins for a gross sum of $296,604.75. In addition, 31 confiscated sealskins, raw, yielded $15.50.

At the second sale, held on May 15, 1933, 20,621 black-dyed and 5,000 logwood brown-dyed skins were sold for $394,303.80. At the same time 282 black-dyed, 229 raw, and 1 unhaired Japanese fur-seal skins sold for $1,755.75. These 512 skins were the United States Government's share of sealskins taken by the Japanese Government at Robben Island in the years 1930 to 1932, inclusive. There was sold also 1 confiscated fur-seal skin, dyed logwood-brown, for $23.

Special sales of Pribilof Islands sealskins authorized by the Secretary of Commerce in the fiscal year 1933 consisted of 184 black dyed, 226 logwood brown-dyed, 10 raw, and 9 exhibition skins, at a total of $7,566.02.

FOXES

The blue-fox herds on St. Paul and St. George Islands are a profitable adjunct to the fur-seal industry, and provide employment during the inactive period of sealing operations.

In the fiscal year 1933 there were sold at public auction 1,401 blue and 25 white fox skins that had been taken in the 1931–32 season. The blue pelts brought $32,151.50, and the white pelts $336.50, a total of $32,488.

Foxing operations in the season of 1932–33 resulted in a take of 249 blue and 22 white fox skins on St. Paul Island and 871 blue and 1 white on St. George Island, a total of 1,143 skins. Thirty-two foxes trapped on St. Paul Island and 408 on St. George Island were marked and released for breeding purposes.

FUR-SEAL SKINS TAKEN BY NATIVES

Exercising the privilege granted them under the provisions of the North Pacific Sealing Convention of July 7, 1911, Indians of the United States and Canada took 1,938 fur-seal skins in 1932, which were duly authenticated by officials of the respective Governments. Of these skins, 78 were taken by natives of southeast Alaska, 73 by natives of Washington, and 1,787 by natives of British Columbia.

FUR-SEAL PATROL

A patrol for the protection of the fur-seal herd was maintained by vessels of the United States Coast Guard, supplemented in the spring by two of the Bureau's fishery patrol vessels.

PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

No changes were made in the regulations for the protection of sea otters, walruses, and sea lions. The taking of sea otters is prohibited at all times, and the killing of walruses and sea lions is authorized only under specified conditions.

LAW ENFORCEMENT DIVISION

The appropriation for enforcing the law regulating interstate transportation of black bass, and for cooperation with local, State, and Federal authorities in protecting and increasing largemouth and smallmouth black bass was reduced 25 percent from last year's ap-

propriation; however, the Bureau has been able to continue and in some respects enlarge the work, securing a fair enforcement of the law in cooperation with the States east of the Rocky Mountains. This has been accomplished with 3 officers in the field, and 1 office assistant, a total of 4 employees, to carry out the intents and purposes of the law in 48 States.

During the year the number of regularly employed State fish and game protectors authorized by the Secretary to enforce the law was increased to 80, located principally in the Eastern and Central States where black bass are most plentiful. These trained State officers received no salary from the Federal Government, and frequently supplied the regularly employed Federal black bass law inspectors transportation and assistance without charge. This cooperation is supplied by the State principally for the reason that a violation of the Federal black bass law is predicated on an infraction of an existing State law followed by a transportation outside of the State.

Every effort has again been made this year to advertise the provisions and purposes of the law. This highly important educational work has been carried on through the daily press, sporting magazines, and radio, and through personal contact between the commercial fishermen and dealers. In addition, the three regularly employed field officers, in their travels from State to State in making market inspections and investigations of alleged illegal shipments of black bass, attended and addressed gatherings of sportsmen, anglers, and State authorities. In sections where this has been done those affected display an intense interest in the work and a sincere disposition to obey the law and cooperate.

It is essential that those who are enforcing the Federal black bass law, and the State officials and others, should be thoroughly familiar with the latest State laws protecting black bass. As the legislatures of 43 States met during the last half of this fiscal year, making many changes, a careful revision of the game-fish laws as formerly published in Fishery Circular No. 9 was made and will be available to those interested.

A large number of reports of violations of the Federal law were received and an investigation was made in every instance. The alleged illegal shipments came principally from the southeastern States, and were consigned to Maryland, Pennsylvania, Indiana, Kansas, Missouri, Tennessee, West Virginia, and other States. In some cases evidence of violation of State law was obtained and turned over to State authorities for action. In other cases, such as an alleged illegal shipment of black bass from Florida to Kansas, it was impossible owing to great distance between point of shipment and consignment for the Bureau officials to make personal investigation due to lack of funds; however, such cases were handled by one or more of the State deputies.

The Federal black bass law inspectors, along with their regular duties, have by request assisted State officers in enforcing the State laws protecting fish whenever possible, and aided in various matters pertaining to the welfare and increase of game fish. They have assisted and advised the States relative to perfecting their black bass laws, and a considerable amount of beneficial game-fish legislation advocated by the Bureau was adopted this year. Five States passed laws prohibiting the sale of black bass regardless of where taken;

2 States adopted State-wide measures for game-fish protection; 5 improved their daily limits, and 1 provided a closed season on black bass during the spawning period; 10 States adopted part-time nonresident angler's licenses at a cost considerably less than the fee for an annual license.

This division is charged with the issuance of permits for taking bait fish in the District of Columbia, and has issued, or renewed, a total of 29 permits during the fiscal year.

VESSELS

The Bureau's motor vessel *Fulmar* stationed at Charlevoix, Mich., and assigned to investigative duty with the Great Lakes scientific staff, was engaged from June 1 to September 13 in upper Lake Michigan north of Frankfort and Sturgeon Bay, Wis., in experimental fishing operations in connection with a study of the destruction occasioned by chub nets to small trout and immature chubs in the region. Owing to the lack of funds this work was discontinued and the vessel placed out of commission for the remainder of the year.

Sixteen vessels of the Alaska service cruised about 133,000 nautical miles in the fiscal year 1933, as compared with 148,500 nautical miles in the previous year. The *Penguin* covered approximately 28,200 miles; the *Teal*, 12,400 miles; the *Brant*, 11,800 miles; and the *Crane*, 10,900 miles.

The *Penguin* continued as tender for the Pribilof Islands with base at Unalaska. Five round trips were made to Seattle during the fiscal year for transporting personnel and emergency supplies.

Of the vessels that engaged in fishery protective work, the *Widgeon*, *Murre*, *Auklet*, and *Petrel* were employed in southeast Alaska throughout the season; the *Teal* was on duty at Cook Inlet until the middle of August and later assisted with the patrol and stream inspection in southeast Alaska; the *Kittiwake* was in the Seward-Katalla district; the *Crane* in the Alaska Peninsula area; the *Eider* in the Alaska Peninsula and Kodiak-Afognak areas; the *Blue Wing* and *Red Wing* in the Kodiak-Afognak area; the *Ibis* at Chignik; the *Scoter* on Bristol Bay; and the *Coot* on the Yukon River. The *Puffin*, which had been replaced by the *Merganser* as tender for the Yes Bay hatchery, participated in the fisheries patrol in the vicinity of Ketchikan.

The *Brant* was used in general supervisory work in southeast Alaska and Prince William Sound. It was engaged also for several weeks in patrolling waters off Neah Bay, Wash., to protect the fur-seal herd during its northward migration. The *Widgeon* performed similar duty in southeast Alaska.

After the close of fishery activities in the fall, the *Brant*, *Crane*, *Eider*, *Kittiwake*, *Murre*, *Scoter*, and *Teal* sailed for Seattle, where they were moored for a number of months. Before returning to Alaska in the spring they were given a general overhauling. The *Penguin* was overhauled at Seattle in November. Other vessels of the Alaska service were tied up for the winter at Alaska ports.

The *Albatross II*, owing to lack of funds, remained out of commission at our Woods Hole (Mass.) station during the entire past fiscal year. A caretaker is employed to look after the vessel.

The steamer *Phalarope*, which was also placed out of commission June 30, 1932, owing to our reduced vessel appropriation, was condemned and sold to the highest bidder.

The *Pelican* was detailed to the International Passamaquoddy Fisheries Commission to assist in special investigations for the commission until October 17, 1932, when the vessel was returned to the Boothbay Harbor (Maine) station to resume its usual fish-cultural activities.

The steamer *Shearwater* was engaged in the usual fish-cultural work at the Put-in-Bay (Ohio) station during the fall and winter months.

APPROPRIATIONS

Appropriations for the Bureau for the fiscal year aggregated $1,976,020, as follows:

Salaries	$175,000
Miscellaneous expenses:	
Administration	3,500
Propagation of food fishes	886,730
Maintenance of vessels	200,000
Inquiry respecting food fishes	200,000
Fishery industries	95,790
Protecting sponge fisheries	3,000
Protecting seal and salmon fisheries of Alaska	390,000
Upper Mississippi Wild Life and Fish Refuge	7,000
Enforcement of black bass law	15,000
Total	1,976,020

U.S. GOVERNMENT PRINTING OFFICE: 1933

ALASKA FISHERY AND FUR-SEAL INDUSTRIES IN 1932 [1]

By WARD T. BOWER, *Chief, Division of Alaska Fisheries*

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[1] Appendix I to the Report of the U.S. Commissioner of Fisheries for 1933. Approved for publication May 27, 1933.

INTRODUCTION

The Bureau's work in Alaska has to do with the conservation of the fisheries and the management of the Pribilof Islands fur-seal herd. This work in 1932 was conducted on the same general plan as in previous years. The Commissioner of Fisheries spent several weeks in Alaska during the summer for personal observation of the salmon fishery.

The regulations for the protection of the fisheries were modified from time to time as the need therefor became apparent, and late in the fall revised regulations were issued to be effective in the following year.

In the patrol of the fishing grounds 15 Bureau vessels and 8 chartered boats were employed, and more than 200 persons were engaged for varying periods. Stream obstructions that blocked the passage of breeding salmon were removed, and some destruction of predatory fishes was accomplished.

Scientific studies of the salmon, herring, and other aquatic resources were continued. Twenty-seven weirs for counting the escapement of spawning salmon were operated as a means of establishing the ratio of escape to catch. The propagation of salmon was carried on at 2 Government hatcheries and 1 private hatchery. Reports of commercial operations were collected, from which data have been compiled and are published herewith.

At the Pribilof Islands 49,336 fur-seal skins were taken, a decrease of 188 from the take for 1931. Killings in general were from surplus 3-year-old male seals. A suitable number of this age class was reserved for breeding stock. The computation of the herd as of August 10, 1932, showed 1,219,961 animals of all classes, an increase of 92,879 over the corresponding figures for the previous year. From the fox herds at the islands there were obtained 1,120 blue and 23 white pelts in the 1932–33 season.

Work was continued on the construction of buildings at the Pribilof Islands for use of the natives and for the sealing industry. Progress was made on the extension of improved roads, and the dock at East Landing on St. Paul Island was completed.

Through the cooperation of the Navy Department the U.S.S. *Sirius* transported the annual supplies to the Pribilof Islands and brought out the season's take of sealskins on the return trip to Seattle. Valuable assistance was rendered also by the United States Coast Guard in maintaining a patrol for the protection of the fur seals.

Two public-auction sales of fur-seal skins were held in 1932, at both of which fox skins were sold also.

Acknowledgment is made of the assistance rendered by members of the Bureau's staff in the preparation of this document.

VISIT OF THE COMMISSIONER OF FISHERIES TO ALASKA

The Commissioner of Fisheries sailed from Seattle for Alaska on the *Brant* on July 1. After spending a few days at Juneau he visited the Prince William Sound area, inspecting the fisheries and calling at the various canneries. No trip was made to the districts farther west, where generally satisfactory runs of salmon were re-

ported. Upon completion of the examination of conditions in Prince William Sound, Commissioner O'Malley devoted several weeks to consideration of the problems in southeast Alaska, and returned to Seattle on August 17. Fishery matters in the Pacific Coast States were given attention by Commissioner O'Malley before his return to Washington, where he arrived on September 5.

REGULATIONS FOR PROTECTION OF WALRUSES AND SEA LIONS

A new (sixth) edition of Department of Commerce Circular No. 286 was issued under date of May 1, 1932, containing the laws and regulations for the protection of walruses and sea lions in Alaska, whereby the prohibition on the killing of those animals, except under certain specified conditions, is extended for a period of 2 years, namely, from May 1, 1932, to April 30, 1934, both dates inclusive.

FISHERY INDUSTRIES

As in corresponding reports for previous years, the Territory of Alaska is here considered in the three coastal geographic sections generally recognized, as follows: (1) Southeast Alaska—embracing all that narrow strip of mainland and the numerous adjacent islands from Portland Canal northwestward to and including Yakutat Bay; (2) central Alaska—the region on the Pacific from Yakutat Bay westward, including Prince William Sound, Cook Inlet, and the southern coast of Alaska Peninsula, to Unimak Pass; and (3) western Alaska—the north shore of the Alaska Peninsula, including the Aleutian Islands westward from Unimak Pass, Bristol Bay, and the Kuskokwim and Yukon Rivers. These divisions are solely for statistical purposes and do not coincide with areas established in departmental regulations.

Detailed reports and statistical tables dealing with the various fishery industries are presented herewith, and there are also given the important features of certain subjects that were the objects of special investigation or inquiry.

LEGISLATION AND EXECUTIVE ORDER REGARDING NEW HALIBUT TREATY

An act to render effective the provisions of the revised Northern Pacific Halibut Convention, which became effective May 9, 1931, was approved by the President May 2, 1932. This act follows the general lines of the previous act covering the first convention, except for the extension of the powers of the Commission provided for under the revised convention.

Under date of June 3, 1932, an Executive order was issued in regard to the maintenance of a patrol for the enforcement of the provisions of the above-mentioned halibut act. The vessels of the Bureau of Fisheries were again specifically included in the public vessels assigned to carry on such patrol, and the masters of these vessels and other regular field employees in the fisheries service were designated as officials to exercise all powers of search and seizure conferred by said act upon persons so designated by the President.

NEW FISHERY REGULATIONS

The regulations for the protection of the fisheries of Alaska, issued December 17, 1931, were amended by the following regulations issued by the Acting Secretary of Commerce under the dates indicated:

[*December 31, 1931*]

KODIAK AREA

Salmon fishery.—Regulation no. 18 (*i*) is amended to read as follows: Kodiak Island: Along the coast on the west side of Uganik Bay between West Point and a point south of Broken Point at 57 degrees 52 minutes 30 seconds north latitude.

[*April 1, 1932*]

BRISTOL BAY AREA

Salmon fishery.—Regulation no. 15 is amended to read as follows: The 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock antemeridian Wednesday to 6 o'clock antemeridian Thursday of each week, making a weekly closed period of 60 hours: *Provided*, That in the waters of Kvichak Bay between the line extending across the bay from the marker on a high point on the east bank of Prosper Creek, about 700 yards above the Koggiung Cannery of the Alaska Packers Association, to the marker on the opposite side, the course being about north, 44 degrees west, magnetic, and the line extending at right angles across the bay from a marker at Jensen Creek to a marker on the opposite shore about 1½ miles west of Squaw Creek, the 36-hour weekly closed period for salmon fishing prescribed by section 5 of the act of June 6, 1924, is hereby extended to include the period from 6 o'clock postmeredian of Saturday of each week to 6 o'clock antemeridian of the Tuesday following and the period from 6 o'clock antemeridian Wednesday to 6 o'clock antemeridian Thursday of each week, making a weekly closed period of 84 hours.

ALASKA PENINSULA AREA

Salmon fishery.—1. Regulation no. 22 (*f*) is amended to read as follows: Along the coast of Bold Cape for a distance of 2,500 feet from a point at 55 degrees 1 minute 12 seconds north latitude, 162 degrees 15 minutes 36 seconds west longitude.

2. Regulation no. 22 (*n*) is amended to read as follows: Unga and Popof Islands: East coast of Unga Island from a point at 55 degrees 12 minutes 10 seconds north latitude, 160 degrees 29 minutes 42 seconds west longitude, southerly and easterly to a point at 55 degrees 11 minutes 30 seconds north latitude, 160 degrees 27 minutes 30 seconds west longitude; and east coast of Popof Island, (1) within 2,500 feet of a point at 55 degrees 16 minutes north latitude, 160 degrees 19 minutes 40 seconds west longitude, and (2) within 2,500 feet of a point at 55 degrees 18 minutes 36 seconds north latitude, 160 degrees 18 minutes 48 seconds west longitude.

KODIAK AREA

Salmon fishery.—1. Regulation no. 18 (*j*) is amended to read as follows: Kodiak Island near entrance to Uyak Bay: Along the coast, (1) within 2,500 feet of a point at 57 degrees 44 minutes 10 seconds north latitude, 153 degrees 56 minutes 30 seconds west longitude, and (2) within 5,000 feet easterly of a point at 57 degrees 41 minutes 48 seconds north latitude, 153 degrees 54 minutes 45 seconds west longitude.

2. Regulation no. 18 (*x*) is amended to read as follows: Afognak Island: (1) From a point on the north side of Raspberry Strait at 58 degrees 8 minutes 45 seconds north latitude, 153 degrees 13 minutes 20 seconds west longitude, north to a point at 58 degrees 9 minutes 30 seconds north latitude, 153 degrees 13 minutes 20 seconds west longitude, and (2) within 2,500 feet of a point on the south side of Paramanof Bay at 58 degrees 18 minutes north latitude, 153 degrees 2 minutes 23 seconds west longitude.

3. Regulation no. 19 (*p*) is amended to read as follows: Kaflia Bay, on north shore of Shelikof Strait: All waters within a line from Cape Ugyak to a point on the south shore of Kaflia Bay at 58 degrees 13 minutes 30 seconds north latitude.

Prince William Sound Area

Salmon fishery.—1. Commercial fishing for salmon in Port Valdez east of 146 degrees 40 minutes west longitude is limited entirely to set or anchored gill nets of not to exceed 450 yards each in length.

2. Regulation no. 10 (*a*) is amended to read as follows: (1) East coast of Knight Island within 2,500 feet of a point at 60 degrees 9 minutes 30 seconds north latitude, and (2) along the coast of Squire Island within ½ statute mile of its southern extremity.

3. Regulation no. 10 (*bb*) is amended to read as follows: West coast of Montague Island form Point Woodcock to a point south of Hanning Bay at 59 degrees 56 minutes 45 seconds north latitude, 147 degrees 45 minutes 15 seconds west longitude.

4. Regulation no. 10 (*cc*) is amended to read as follows: West coast of Montague Island from the north side of the entrance to Hanning Bay northeasterly to 60 degrees 9 minutes 45 seconds north latitude, exclusive of the coast between 60 degrees 3 minutes 15 seconds north latitude and 60 degrees 4 minutes 30 seconds north latitude.

5. Regulation no. 10 (*dd*) is amended to read as follows: Western coast of Montague Island from 60 degrees 10 minutes 20 seconds north latitude to 60 degrees 11 minutes 45 seconds north latitude.

Herring fishery.—1. Regulation no. 2 is amended to read as follows: Commercial fishing for herring, except for bait purposes, is prohibited from 12 o'clock noon of Wednesday until 12 o'clock noon of Thursday of each week, and from 12 o'clock noon of Saturday until 12 o'clock noon of the Sunday following.

2. Regulation no. 6 is amended to read as follows: Commercial fishing for herring, including bait fishing, by means of any purse seine more than 1,400 meshes in depth, more than 150 fathoms in length, or of mesh less than 1½ inches stretched measure between knots is prohibited: *Provided*, That any purse seine may have in addition a strip along the bottom not to exceed 30 meshes in depth and of mesh not less than 4 inches stretched measure between knots. No extension to any seine in the way of leads will be permitted.

Southeastern Alaska Area

ICY STRAIT DISTRICT

Salmon fishery.—Regulation no. 15 (*k*) is amended to read as follows: Pleasant Island: Southern coast from the western extremity of the island easterly to 135 degrees 33 minutes 10 seconds west longitude; and Porpoise Islands, west coast of southernmost island within 2,500 feet of a point at 58 degrees 19 minutes north latitude, 135 degrees 27 minutes 31 seconds west longitude.

WESTERN DISTRICT

Salmon fishery.—1. Regulation no. 19 (*e*) is amended to read as follows: Baranof Island: From a point one-half statute mile south of Point Thatcher to a point north of Point Lull at 57 degrees 19 minutes 30 seconds north latitude, exclusive of the coast between 57 degrees 20 minutes 35 seconds north latitude and 57 degrees 23 minutes 30 seconds north latitude.

2. Regulation no. 19 (*l*) is amended to read as follows: (1) West coast of Admiralty Island from Village Point to Distant Point, and (2) Killisnoo Island, northwest coast between 57 degrees 28 minutes 10 seconds north latitude and 57 degrees 28 minutes 26 seconds north latitude.

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation no. 14 (*i*) is amended to read as follows: (1) Sukkwan Island: Southwestern coast from 55 degrees 2 minutes 30 seconds north latitude to the southern extremity of the island, exclusive (*a*) of the coast from 55 degrees 1 minute 15 seconds north latitude to 55 degrees 0 minutes 45 seconds north latitude, and (*b*) exclusive of the waters of Kasook Inlet

and its tributaries and branches; and (2) McFarland Islands: Southwest coast of the westernmost island within 2,500 feet of a point at 55 degrees 2 minutes 35 seconds north latitude, 132 degrees 55 minutes 15 seconds west longitude.

2. Regulation no. 14 (*j*) is amended to read as follows: Prince of Wales Island, from Point Webster southeasterly to 54 degrees 54 minutes 49 seconds north latitude, exclusive of the waters of Kassa Inlet and its tributaries and branches.

SOUTHERN DISTRICT

Salmon fishery.—1. Regulation no. 16 (*l*) is amended to read as follows: Cape Fox Island and within 1,000 feet of a point on the western shore of the unnamed island near the mainland shore at 54 degrees 47 minutes 42 seconds north latitude.

2. Regulation no. 16 (*s*) is amended to read as follows: Kanagunut Island: West coast from 54 degrees 44 minutes 30 seconds north latitude, 130 degrees 43 minutes 18 seconds west longitude, to Garnet Point, and along the east coast within 2,500 feet of Garnet Point.

[*April 15, 1932*]

Salmon fishery.—No trap shall be permitted to operate in the season of 1932 as follows:

ALASKA PENINSULA AREA

1. Mainland coast, including adjacent islands, from Entrance Point to Cape Rozhnof. (22*a*.)

2. Along the coast on the east side of Morzhovoi Bay within 2,500 feet, measured along the coast, from a point at 55 degrees 0 minute 38 seconds north latitude, 162 degrees 57 minutes 48 seconds west longitude. (22*e*.)

3. Along the coast on the south and east side of Kitchen Anchorage, Belkofski Bay, within a distance of 2,500 feet, measured along the coast, from a point at 55 degrees 7 minutes 30 seconds north latitude, 162 degrees 6 minutes 42 seconds west longitude. (22*g*.)

4. Goloi Island: Coast for a distance of 4,000 feet northeasterly from the western extremity of the island. (22*i*.)

5. Along the coast on the north side of Volcano Bay within 2,500 feet, measured along the coast, from a point at 55 degrees 14 minutes 6 seconds north latitude, 161 degrees 58 minutes 36 seconds west longitude. (22*j*.)

6. Mainland coast along the west side of Pavlof Bay: (1) Between 55 degrees 15 minutes 30 seconds north latitude and 55 degrees 18 minutes 11 seconds north latitude, and (2) between 55 degrees 18 minutes 59 seconds north latitude and 55 degrees 20 minutes north latitude. (22*l*.)

7. Mainland coast along the east side of Pavlof Bay: (1) Within 2,500 feet, measured along the coast, from a point at 55 degrees 35 minutes 12 seconds north latitude; (2) within 2,500 feet, measured along the coast, from a point at 55 degrees 29 minutes 38 seconds north latitude; and (3) within 2,500 feet of a point at 55 degrees 23 minutes 42 seconds north latitude. (22*m*.)

KODIAK AREA

1. Raspberry Island: West coast from Raspberry Cape at 58 degrees 3 minutes 25 seconds north latitude, 153 degrees 25 minutes 30 seconds west longitude, northeast to a point at 58 degrees 4 minutes 30 seconds north latitude, 153 degrees 24 minutes 20 seconds west longitude. (17*b*.)

2. Afognak Island: From a point on the north side of Raspberry Strait at 58 degrees 8 minutes 45 seconds north latitude, 153 degrees 13 minutes 20 seconds west longitude, north to a point at 58 degrees 9 minutes 30 seconds north latitude, 153 degrees 13 minutes 20 seconds west longitude. (18*x*.)

COOK INLET AREA

1. Along the mainland coast on the west side of Cook Inlet, (1) from a point at 60 degrees 48 minutes north latitude southeasterly to a point at 60 degrees 46 minutes 45 seconds north latitude, and (2) within 2,500 feet of a point at 60 degrees 45 minutes 4 seconds north latitude. (14*b*.)

2. Along the mainland coast on the east side of Cook Inlet, (1) between 60 degrees 55 minutes 15 seconds north latitude and 60 degrees 54 minutes north latitude, and (2) within 2,500 feet of a point at 60 degrees 50 minutes 33 seconds north latitude, 150 degrees 55 minutes 33 seconds west longitude. (14*h*.)

3. Along the mainland coast on the east side of Cook Inlet within 2,500 feet of a point at 60 degrees 49 minutes 34 seconds north latitude, 150 degrees 58 minutes 3 seconds west longitude. (14*i*.)

4. Along the mainland coast on the east side of Cook Inlet, (1) within 2,500 feet of a point at 60 degrees 27 minutes 23 seconds north latitude, 151 degrees 17 minutes 20 seconds west longitude; (2) within 2,500 feet of a point at 60 degrees 10 minutes 31 seconds north latitude, 151 degrees 28 minutes 54 seconds west longitude; (3) within 2,500 feet of a point at 60 degrees 8 minutes 18 seconds north latitude; (4) within 2,500 feet of a point at 60 degrees 7 minutes 22 seconds north latitude, 151 degrees 33 minutes 44 seconds west longitude; and (5) within 2,500 feet of a point at 59 degrees 49 minutes north latitude, 151 degrees 50 minutes 10 seconds west longitude. (14*k*.)

5. Along the mainland coast on the east side of Cook Inlet on the west side of Nubble Point Spit within 1,200 feet of a point at 59 degrees 28 minutes 45 seconds north latitude, 151 degrees 35 minutes 6 seconds west longitude. (14*m*.)

6. Along the mainland coast on the east side of Cook Inlet from a point at 59 degrees 26 minutes 30 seconds north latitude, 151 degrees 46 minutes west longitude, westerly to a point at 59 degrees 26 minutes 40 seconds north latitude, 151 degrees 46 minutes 45 seconds west longitude. (14*n*.)

Prince William Sound Area

1. Culross Island: East coast, (1) within 5,000 feet northeasterly of a point on the southeast coast at 148 degrees 8 minutes 45 seconds west longitude, and (2) between 60 degrees 43 minutes 30 seconds north latitude and a point on the south side of the entrance to Culross Bay at 148 degrees 8 minutes 30 seconds west longitude. (10*d*.)

2. Along the mainland coast between the outermost extremity of Point Pellew and a point at 60 degrees 50 minutes 30 seconds north latitude, 147 degrees 37 minutes 45 seconds west longitude. (10*f*.)

3. Western side of Valdez Arm from Point Freemantle to a point at 60 degrees 56 minutes north latitude. (10*h*.)

4. From the north side of the entrance to Sawmill Bay in Valdez Arm to a point on the coast 1 statute mile northeastward. (10*i*.)

5. Bligh Island: Southwest coast from a point at 60 degrees 48 minutes 37 seconds north latitude, 146 degrees 48 minutes 47 seconds west longitude, to a point at 146 degrees 44 minutes 20 seconds west longitude. (10*j*.)

6. Within ½ statute mile of the southwestern extremity of Bidarka Point. (10*k*.)

7. From a point on the east side of Landlocked Bay at 60 degrees 49 minutes north latitude to a point on the north shore of Port Fidalgo at 146 degrees 32 minutes west longitude. (10*l*.)

8. Mainland coast from a point at 60 degrees 40 minutes 56 seconds north latitude, 146 degrees 39 minutes 36 seconds west longitude, to a point east of Knowles Head at 146 degrees 36 minutes 20 seconds west longitude. (10*o*.)

9. Within 1 statute mile of Red Head. (10*p*.)

10. From a point on the coast 1 statute mile northwestward of the light at Gravina Point to a point on the coast 2 statute miles northwestward of the light at Gravina Point, making an open space of 1 statute mile. (10*q*.)

11. Hinchinbrook Island: Within 3,000 feet, measured westerly along the north side of a peninsula, from a point at 60 degrees 28 minutes 47 seconds north latitude, 146 degrees 23 minutes 27 seconds west longitude. (10*t*.)

12. Hinchinbrook Island: From a point on the coast at 60 degrees 28 minutes north latitude northward to the light at Johnstone Point. (10*w*.)

13. Hinchinbrook Island: From a point on the coast 2½ statute miles north of the southwestern extremity of Bear Cape northward to a point at 60 degrees 24 minutes 53 seconds north latitude, 146 degrees 42 minutes 24 seconds west longitude. (10*x*.)

14. Montague Island: Western coast from Point Woodcock to a point at 59 degrees 55 minutes 10 seconds north latitude. (10*bb*.)

15. Montague Island: Western coast, (1) between 59 degrees 59 minutes 50 seconds north latitude, 147 degrees 40 minutes west longitude, and 60 degrees 1 minute 50 seconds north latitude, 147 degrees 34 minutes 40 seconds west longitude, and (2) between 60 degrees 6 minutes 6 seconds north latitude and 60 degrees 9 minutes north latitude (as shown on U.S. Coast and Geodetic Survey Chart No. 8555). (10*cc*.)

16. Northern coast of Montague Island from Graveyard Point to a point at 60 degrees 21 minutes 41 seconds north latitude, 147 degrees 9 minutes 47 seconds west longitude. (10 *ee*.)

Southeastern Alaska Area

Icy Strait District

1. Mainland: From the east side of Dundas Bay at 58 degrees 20 minutes north latitude to a point 1,000 feet east of Point Dundas. (15*a*.)

2. George Islands: Any part of that island of the George Islands group located at 58 degrees 12 minutes 18 seconds north latitude. (15*c*.)

3. Chichagof Island: North coast within 2,500 feet of a point at 58 degrees 13 minutes 4 seconds north latitude, 136 degrees 9 minutes 47 seconds west longitude. (15*f*.)

4. Chichagof Island: North coast within 1,000 feet westerly from Eagle Point. (15*g*.)

5. Chichagof Island: North coast from a point 1,000 feet southerly from Pinta Cove Point westward to a point southeast of Point Adolphus at 58 degrees 16 minutes 30 seconds north latitude. (15*h*.)

6. Lemesurier Island: Northwest coast between the western and northern extremities of the island. (15*i*.)

7. Mainland: From Point Gustavus to 135 degrees 50 minutes west longitude. (15*j*.)

8. Pleasant Island: Southern coast between 135 degrees 40 minutes west longitude and 135 degrees 36 minutes 30 seconds west longitude. (15*k*.)

9. Mainland: Between 58 degrees 19 minutes 30 seconds north latitude and 58 degrees 22 minutes 30 seconds north latitude. (15*l*.)

10. Chichagof Island: Northeast coast between 135 degrees 23 minutes west longitude and 135 degrees 20 minutes west longitude. (15*m*.)

Western District

1. Chichagof Island: East coast, (1) between 58 degrees north latitude and a point on the north side of the entrance to False Bay at 57 degrees 58 minutes 30 seconds north latitude; (2) between 57 degrees 56 minutes north latitude and 57 degrees 54 minutes 50 seconds north latitude; and (3) between 57 degrees 52 minutes north latitude and North Passage Point. (19*c*.)

2. Chichagof Island: East coast, (1) between 57 degrees 42 minutes 30 seconds north latitude and a point on the coast 1 statute mile north of 57 degrees 37 minutes 47 seconds north latitude, 134 degrees 52 minutes 41 seconds west longitude, and (2) between 57 degrees 29 minutes 30 seconds north latitude and Point Hayes. (19*d*.)

3. Baranof Island: East coast, (1) from a point ½ statute mile south of Point Thatcher to a point at 57 degrees 23 minutes 30 seconds north latitude, and (2) between 57 degrees 20 minutes 35 seconds north latitude and 57 degrees 19 minutes 30 seconds north latitude. (19*e*.)

4. Baranof Island: East coast from a point ½ statute mile southeasterly of South Point to a point at 57 degrees 15 minutes north latiude. (19*f*.)

5. Mansfield Peninsula: West coast from 58 degrees 22 minutes 6 seconds north latitude southerly to 58 degrees 19 minutes 35 seconds north latitude. (19*h*.)

6. Mansfield Peninsula: West coast between 58 degrees 17 minutes 30 seconds north latitude and 58 degrees 16 minutes 15 seconds north latitude. (19*i*.)

7. Mansfield Peninsula: West coast between 58 degrees 11 minutes 17 seconds north latitude and 58 degrees 10 minutes 7 seconds north latitude. (19*j*.)

8. Admiralty Island: West coast, (1) between 57 degrees 48 minutes 30 seconds north latitude and 57 degrees 49 minutes 55 seconds north latitude, and (2) between 57 degrees 54 minutes north latitude and 57 degrees 56 minutes north latitude. (19*k*.)

EASTERN DISTRICT

1. Mainland, east side of Stephens Passage: Along the coast within 2,500 feet of a point at 57 degrees 52 minutes 40 seconds north latitude, 133 degrees 46 minutes 50 seconds west longitude. (16*d*.)

2. Mainland, east side of Stephens Passage: From a point on the north side of Windham Bay at 133 degrees 33 minutes west longitude to a point at 57 degrees 33 minutes 55 seconds north latitude, 133 degrees 34 minutes 30 seconds west longitude. (16*e*.)

3. Mainland, between Hobart Bay and Windham Bay: Between 57 degrees 28 minutes 18 seconds north latitude and 57 degrees 30 minutes north latitude. (16*f*.)

4. Mainland: From a point on the north side of Port Houghton at 133 degrees 26 minutes west longitude to a point north of Point Hobart at 57 degrees 23 minutes north latitude. (16*g*.)

5. Mainland, Frederick Sound: (1) From a point on the south side of Fanshaw Bay at 133 degrees 32 minutes 30 seconds west longitude to Cape Fanshaw, thence southeasterly to 133 degrees 31 minutes west longitude, and (2) between 133 degrees 22 minutes west longitude and 133 degrees 21 minutes west longitude. (16*h*.)

6. Admiralty Island: Southeast coast between 57 degrees 12 minutes north latitude and Deepwater Point. (16*j*.)

7. Admiralty Island: Southeast coast from a point ½ statute mile southwest of Point Brightman to a point at 57 degrees 3 minutes 54 seconds north latitude. (16*k*.)

8. Kupreanof Island: Northwest coast from a point ½ statute mile southeast of the outer extremity of Point Macartney northward and westward to the western extremity of Point Macartney. (16*l*.)

9. Kuiu Island: Within ¼ statute mile of the western extremity of Cornwallis Point. (16*m*.)

10. Kuiu Island: Northwest coast, (1) from a point 1 statute mile north of the north side of the entrance to Washington Bay to a point at 56 degrees 45 minutes 16 seconds north latitude, and (2) from a point at 56 degrees 48 minutes 29 seconds north latitude to a point at 56 degrees 50 minutes 13 seconds north latitude. (16*n*.)

NORTH PRINCE OF WALES ISLAND DISTRICT

1. Kosciusko Island: Western coast from a point 1,000 feet northwesterly from the southern extremity of land at the west side of Halibut Harbor to 55 degrees 56 minutes north latitude. (15*l*.)

2. Kosciusko Island: Western coast, (1) within 5,000 feet southerly of Ruins Point at 56 degrees 4 minutes north latitude, and (2) within 5,000 feet northerly of 55 degrees 59 minutes 40 seconds north latitude. (15*m*.)

3. Kuiu Island: East coast of peninsula between Port Beauclerc and Reid Bay from 56 degrees 18 minutes 30 seconds north latitude northward to 56 degrees 19 minutes 30 seconds north latitude. (15*s*.)

4. Prince of Wales Island: North coast between 133 degrees 29 minutes 4 seconds west longitude and 133 degrees 32 minutes 5 seconds west longitude. (15*t*.)

5. Prince of Wales Island: North coast between 133 degrees 22 minutes west longitude and 133 degrees 24 minutes 25 seconds west longitude. (15*u*.)

6. Prince of Wales Island: East coast between 55 degrees 56 minutes 50 seconds north latitude and 55 degrees 56 minutes north latitude. (15*ff*.)

7. Prince of Wales Island: East coast between 55 degrees 47 minutes 30 seconds north latitude and 55 degrees 46 minutes 30 seconds north latitude. (15 *hh*.)

8. Cleveland Peninsula: (1) Between 55 degrees 35 minutes 19 seconds north latitude and 55 degrees 36 minutes 10 seconds north latitude; (2) between 132 degrees 5 minutes 45 seconds west longitude and 132 degrees 4 minutes west longitude; and (3) between 55 degrees 30 minutes 50 seconds north latitude and 55 degrees 32 minutes north latitude. (15*nn*.)

9. Gravina Island: West coast, (1) between 55 degrees 22 minutes north latitude and 55 degrees 18 minutes north latitude; (2) between 55 degrees 10 minutes 30 seconds north latitude and 55 degrees 9 minutes 30 seconds north latitude; and (3) from 55 degrees 8 minutes north latitude to the southern extremity of Dahl Head, including the rocky islets adjacent to this coast. (15*pp*.)

10. Grindall Island, off Grindall Point, Prince of Wales Island: South coast within ⅛ statute mile of a point at 55 degrees 26 minutes 20 seconds north latitude, 132 degrees 8 minutes 1 second west longitude. (15*uu*.)

11. Prince of Wales Island: East coast between 55 degrees 28 minutes north latitude and 55 degrees 37 minutes 25 seconds north latitude. (15*vv*.)

12. Prince of Wales Island: East coast, (1) between 55 degrees 20 minutes 10 seconds north latitude and 55 degrees 20 minutes 51 seconds north latitude, and (2) between 55 degrees 21 minutes 52 seconds north latitude, 132 degrees 10 minutes west longitude, and 55 degrees 22 minutes 17 seconds north latitude, 132 degrees 11 minutes 40 seconds west longitude. (15*ww*.)

13. Prince of Wales Island: East coast between 55 degrees 12 minutes north latitude and 55 degrees 15 minutes 15 seconds north latitude, including Wedge Island. (15*yy*.)

14. Prince of Wales Island: East coast between 55 degrees 5 minutes 8 seconds north latitude, 132 degrees 3 minutes 30 seconds west longitude, and 55 degrees 6 minutes 19 seconds north latitude, 132 degrees west longitude. (15*zz*.)

15. Prince of Wales Island: East coast between 54 degrees 59 minutes 33 seconds north latitude and 55 degrees 1 minute 28 seconds north latitude, including Polk Island. (15*aaa*.)

16. Prince of Wales Island: East coast between 54 degrees 50 minutes 45 seconds north latitude and a point on the south side of Kendrick Bay at 131 degrees 59 minutes west longitude. (15*ddd*.)

17. Prince of Wales Island: East coast from McLean Point to a point 3,500 feet southward. (15*eee*.)

18. Prince of Wales Island: From a point on Cape Chacon at 54 degrees 41 minutes 23 seconds north latitude, 132 degrees 1 minute west longitude, northerly to a point at approximately 54 degrees 45 minutes north latitude, 132 degrees west longitude. (15*fff*.)

SOUTH PRINCE OF WALES ISLAND DISTRICT

1. Dall Island: Coast from a point on the south side of the entrance to McLeod Bay at 54 degrees 41 minutes 3 seconds north latitude, southeasterly to Kaigani Village, including coast line of nearby island within 300 feet of a point at 54 degrees 40 minutes 30 seconds north latitude, 132 degrees 39 minutes 51 seconds west longitude. (14*g*.)

2. Long Island, east of Dall Island: West coast within 2,500 feet measured along the coast from 54 degrees 46 minutes 15 seconds north latitude. (14*h*.)

3. Prince of Wales Island: From a point at the south side of the entrance to Kassa Inlet at 54 degrees 55 minutes 18 seconds north latitude southerly to 54 degrees 54 minutes 49 seconds north latitude. (14*j*.)

4. Prince of Wales Island: South coast between Brownson Bay and Nichols Bay from a point at 54 degrees 42 minutes 30 seconds north latitude, 132 degrees 10 minutes west longitude, easterly to a point at 54 degrees 41 minutes 26 seconds north latitude, 132 degrees 7 minutes 51 seconds west longitude. (14*n*.)

5. Prince of Wales Island: From a point at 54 degrees 41 minutes 40 seconds north latitude, 132 degrees 2 minutes west longitude, eastward and southward to Cape Chacon at 54 degrees 41 minutes 23 seconds north latitude, 132 degrees 1 minute west longitude. (14*o*.)

SOUTHERN DISTRICT

1. Revillagigedo Island: Southwest coast between 131 degrees 27 minutes 32 seconds west longitude and 131 degrees 24 minutes 41 seconds west longitude. (16*c*.)

2. Revillagigedo Island: From Cone Point southerly to a point at 55 degrees 14 minutes 30 seconds north latitude, 131 degrees 18 minutes 56 seconds west longitude, including Cone Island. (16*d*.)

3. Revillagigedo Island: (1) Within ½ statute mile of Escape Point, and (2) from a point north of Point Higgins at 55 degrees 27 minutes 45 seconds north latitude to Survey Point. (16*e*.)

4. Mainland peninsula between Smeaton Bay and Boca de Quadra: Between 55 degrees 10 minutes 53 seconds north latitude and 55 degrees 9 minutes 30 seconds north latitude. (16*g*.)

5. Southwestern coast of island located southwesterly from Kah Shakes Point at 55 degrees 2 minutes 42 seconds north latitude, 131 degrees 0 minutes 33 seconds west longitude. (16*h*.)

6. Mainland south of Kah Shakes Cove: From a point at 55 degrees 1 minute 54 seconds north latitude southerly to Kirk Point. (16*j*.)

7. Duke Island: East coast from a point on the south shore near Kelp Island at 131 degrees 15 minutes 12 seconds west longitude northward to a point at 54 degrees 53 minutes 18 seconds north latitude, 131 degrees 13 minutes 40 seconds west longitude. (16*n*.)

8. Kelp Island: Southern coast between the western extremity of the island and a point at 131 degrees 16 minutes west longitude. (16*o*.)

ALL AREAS

The number and letter after each regulation in this supplement refer to the original regulation as printed in Department of Commerce Circular No. 251, eighteenth edition, dated December 17, 1931, and have been included herein for convenience in referring to the original regulation.

[*May 19, 1932*]

Salmon fishery.—No trap shall be permitted to operate in the season of 1932 as follows:

KODIAK AREA

1. Kodiak Island near entrance to Uyak Bay: Within 2,500 feet of a point at 57 degrees 44 minutes 10 seconds north latitude, 153 degrees 56 minutes 30 seconds west longitude. (18*j*.)

SOUTHEASTERN ALASKA AREA

EASTERN DISTRICT

1. Mainland: Between 58 degrees north latitude and 57 degrees 59 minutes 10 seconds north latitude. (16*b*.)

NORTH PRINCE OF WALES ISLAND DISTRICT

1. San Fernando Island: Northern coast from a point at 133 degrees 25 minutes 30 seconds west longitude to a point at 133 degrees 24 minutes west longitude. (15*c*.)

2. St. Philip Island: Within 2,500 feet of the western extremity of the island. (15*e*.)

3. Prince of Wales Island: Coast along San Christoval Channel between 55 degrees 36 minutes 25 seconds north latitude and 55 degrees 35 minutes 30 seconds north latitude. (15*g*.)

4. Heceta Island: Southwestern coast between 55 degrees 42 minutes 45 seconds north latitude and 55 degrees 42 minutes 10 seconds north latitude. (15*h*.)

5. Tuxekan Island: Western coast within 1,000 feet of the western extremity of Turn Point. (15*j*.)

6. Prince of Wales Island: East Coast (1) between 55 degrees 55 minutes 20 seconds north latitude and 55 degrees 53 minutes 45 seconds north latitude, and (2) between 55 degrees 53 minutes north latitude and 55 degrees 52 minutes 25 seconds north latitude. (15*ff*.)

7. Gravina Island: West coast between 55 degrees 11 minutes 30 seconds north latitude and 55 degrees 10 minutes 30 seconds north latitude; and along the coast of any island of the Bronaugh Islands group located off the coast of Dall Head. (15*pp*.)

8. Prince of Wales Island: East coast between 55 degrees 6 minutes 19 seconds north latitude, 132 degrees west longitude, and 55 degrees 6 minutes 54 seconds north latitude. (15*zz*.)

9. Prince of Wales Island: East coast from a point at 54 degrees 49 minutes 46 seconds north latitude, 131 degrees 57 minutes 40 seconds west longitude, north of the entrance to Gardner Bay, northwesterly to a point at 54 degrees 50 minutes 45 seconds north latitude. (15*ddd*.)

SOUTH PRINCE OF WALES ISLAND DISTRICT

1. St. Ignace Island: Within ⅜ statute mile of the southern extremity of the island. (14*b*.)

SOUTHERN DISTRICT

1. Regulation no. 6 in supplement no. 251–18–3 is amended to read as follows: Mainland south of Kah Shakes Cove: From a point at 55 degrees 1 minute 54 seconds north latitude southerly to a point at 55 degrees north latitude. (16*j*.)

ALL AREAS

The number and letter after each regulation in this supplement refer to the original regulation as printed in Department of Commerce Circular No. 251, eighteenth edition, dated December 17, 1931, and have been included herein for convenience in referring to the original regulation.

[*June 1, 1932*]

PRINCE WILLIAM SOUND AREA

Clam fishery.—1. Regulation no. 3 is amended to read as follows: The taking of razor clams for commercial purposes is prohibited from 6 o'clock postmeridian June 25 to 6 o'clock postmeridian August 31 in each calendar year.

COPPER RIVER AREA

Clam fishery.—1. Regulation no. 3 is amended to read as follows: The taking of razor clams for commercial purposes is prohibited from 6 o'clock postmeridian June 25 to 6 o'clock postmeridian August 31 in each calendar year.

SOUTHEASTERN ALASKA AREA

Herring fishery.—1. Regulation no. 4 is amended to read as follows: All commercial fishing for herring, including bait fishing, is prohibited, as follows: All waters of Seymour Canal, Gambier Bay, Pybus Bay, the adjoining waters of Frederick Sound, and all contiguous waters, within a line extending from the southern extremity of Point Hugh to the northwesternmost point of Akusha Island, thence to the light at Turnabout Island, thence to Deepwater Point at 57 degrees 10 minutes 20 seconds north latitude, 134 degrees 13 minutes west longitude: *Provided*, That this prohibition shall not apply (*a*) to the taking of herring for bait by boats of not more than 50 feet in length, as shown by official register length, in the period from June 1 to December 31, both dates inclusive; (*b*) to commercial fishing for herring, including bait fishing, by means of gill nets of mesh not less than 2½ inches stretched measure between knots in the period from June 1 to December 31, both dates inclusive; and (*c*) to the taking of herring for bait by salmon trolling boats by means of any gill net of mesh not more than 2½ inches stretched measure between knots, of not greater than no. 20 gill net thread, and not exceeding 10 fathoms in length and 100 meshes in depth.

[*June 10, 1932*]

Salmon fishery.—No trap shall be permitted to operate in the season of 1932 as follows:

KODIAK AREA

1. Raspberry Island: Within 2,500 feet of a point on the south coast of Raspberry Island at 58 degrees 2 minutes 43 seconds north latitude, 153 degrees 18 minutes 54 seconds west longitude. (18*d*.)

2. Uganik Island: South coast within 3,000 feet of a point at 57 degrees 54 minutes north latitude, 153 degrees 30 minutes west longitude. (18*h*.)

3. Kodiak Island: Along the coast on the west side of Uganik Bay between 57 degrees 50 minutes 30 seconds north latitude and 57 degrees 51 minutes 32 seconds north latitude. (18*i*.)

Southeastern Alaska Area

WESTERN DISTRICT

1. Baranof Island: East coast from a point at 57 degrees 15 minutes north latitude southerly to a point at 57 degrees 13 minutes 30 seconds north latitude. (19*f*.)

2. Baranof Island: East coast from a point at 57 degrees 11 minutes 30 seconds north latitude to a point 1 statute mile northwesterly of Point Turbot. (19*g*.)

3. Admiralty Island: West coast between 57 degrees 42 minutes 30 seconds north latitude and 57 degrees 44 minutes 20 seconds north latitude. (19*k*.)

EASTERN DISTRICT

1. Regulation no. 8 in supplement no. 251–18–3, closing the coast of Kupreanof Island to trap fishing in 1932 from a point ½ statute mile southeast of the outer extremity of Point Macartney northward and westward to the western extremity of Point Macartney, is hereby rescinded. (16*l*.)

2. Regulation no. 9 in supplement no. 251–18–3, closing the coast of Kuiu Island to trap fishing in 1932 within ¼ statute mile of the western extremity of Cornwallis Point, is hereby rescinded. (16*m*.)

North Prince of Wales Island District

1. Prince of Wales Island: East coast from a point 1 statute mile northwest of the mouth of Eagle Creek southerly to a point at 55 degrees 56 minutes 50 seconds north latitude. (15*ff*.)

ALL AREAS

The number and letter after each regulation in this supplement refer to the original regulation as printed in Department of Commerce circular no. 251, eighteenth edition, dated December 17, 1931, and have been included herein for convenience in referring to the original regulation.

[*June 15, 1932*]

Kodiak Area

Herring fishery.—Regulation no. 1 is amended to read as follows: Commercial fishing for herring, except for bait purposes, is prohibited during the period from January 1 to June 15, both dates inclusive.

[*June 27, 1932*]

Prince William Sound Area

Herring fishery.—1. Regulation no. 6 is amended to read as follows: Commercial fishing for herring, including bait fishing, by means of any purse seine more than 1,200 meshes in depth, more than 150 fathoms in length, or of mesh less than 1½ inches stretched measure between knots is prohibited: *Provided*, That in the period from August 1 to November 15, both dates inclusive, commercial fishing for herring, including bait fishing, by means of any purse seine more than 1,200 meshes in depth, more than 180 fathoms in length, or less than 1½ inches stretched measure between knots is prohibited: *And provided further*, That any purse seine may have in addition a strip along the bottom not to exceed 30 meshes in depth and of mesh not less than 4 inches stretched measure between knots. No extension to any seine in the way of leads will be permitted.

[*June 29, 1932*]

Bristol Bay Area

Salmon fishery.—In addition to existing prohibitions, commercial fishing for salmon in the Nushagak district, which embraces the waters of Nushagak Bay within a line from Point Protection to Etolin Point, is prohibited from 6 o'clock antemeridian Thursday to 7 o'clock antemeridian Thursday of each week, in the period prior to 6 o'clock antemeridian August 3.

SOUTHEASTERN ALASKA AREA

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—No trap shall be permitted to operate in the season of 1932 as follows: Prince of Wales Island: East coast from the outer point of land on the north side of Kendrick Bay at approximately 131 degrees 58 minutes 30 seconds west longitude northward to 54 degrees 54 minutes 45 seconds north latitude. This amends regulation no. 15*ccc*.

[*July 7, 1932*]

SOUTHEASTERN ALASKA AREA

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—Regulation no. 15*x* is amended to read as follows: Etolin Island: West coast, (1) from 56 degrees 18 minutes north latitude southerly to a point at 56 degrees 16 minutes 24 seconds north latitude, and (2) between Steamer Point light and Steamer Point.

[*July 8, 1932*]

COOK INLET AREA

Salmon fishery.—Commercial fishing for salmon is permitted in the waters of Kamishak Bay and Chinik Inlet to within 500 yards outside the mouth of Chinik Creek from 6 o'clock antemeridian July 9 to 6 o'clock postmeridian August 1.

[*July 11, 1932*]

BERING RIVER AREA

The Bering River area is hereby defined to include all territorial coastal and tributary waters of Alaska within a line extending from Point Martin to Cape St. Elias and thence to Cape Suckling.

SOUTHEASTERN ALASKA AREA

WESTERN DISTRICT

Salmon fishery.—No trap shall be permitted to operate in the season of 1932 as follows: Admiralty Island: West coast from 57 degrees 56 minutes 20 seconds north latitude northward to 57 degrees 59 minutes 15 seconds north latitude. This amends regulation no. 19*k*.

[*July 14, 1932*]

SOUTHEASTERN ALASKA AREA

SOUTHERN DISTRICT

Salmon fishery.—No trap shall be permitted to operate in the season of 1932 as follows: Tongass Island: West coast within 1,000 feet of a point at 54 degrees 46 minutes 31 seconds north latitude. This amends regulation no. 16*r*.

[*July 23, 1932*]

PRINCE WILLIAM SOUND AREA

Herring fishery.—Regulation no. 1 in supplement no. 251-18-8 is amended so as to permit commercial fishing for herring by means of purse seines 1,400 meshes in depth.

[*July 29, 1932*]

SOUTHEASTERN ALASKA AREA

ICY STRAIT, WESTERN, EASTERN, SOUTH PRINCE OF WALES ISLAND, AND SOUTHERN DISTRICTS

Salmon fishery.—The regulation prohibiting commercial fishing for salmon by trolling from 6 o'clock antemeridian August 25 to 6 o'clock postmeridian September 20 is hereby revoked.

WESTERN DISTRICT

Salmon fishery.—Regulation no. 1 in supplement no. 251-18-3 is amended so as to prohibit the operation of any trap in the season of 1932 on the east coast of Chichagof Island between 57 degrees 51 minutes 30 seconds north latitude and the eastern extremity of North Passage Point.

[*July 30, 1932*]

PRINCE WILLIAM SOUND AREA

Salmon fishery.—Regulation no. 8 is amended to read as follows: Commercial fishing for salmon is prohibited during the remainder of each calendar year after 6 o'clock postmeridian August 3: *Provided*, That this prohibition shall not apply (*a*) to trolling and gill netting through August 15 in the waters along the western coast from the outer point on the north shore of Granite Bay (known as Granite Bay Point) to the light on the south shore of the entrance to Port Nellie Juan, nor (*b*) to trolling in the period from 6 o'clock antemeridian August 2 to 6 o'clock postmeridian September 20 in the waters of Prince William Sound east of 147 degrees west longitude, exclusive of all waters of Valdez Arm north of Point Freemantle. All trap leads from shore to entrance of hearts must be removed prior to 6 o'clock antemeridian August 10.

[*August 8, 1932*]

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

Salmon fishery.—Regulation no. 6 is amended to read as follows: Commercial fishing for salmon, other than trolling, is prohibited prior to 6 o'clock antemeridian June 15 in each calendar year and for the remainder of each calendar year after 6 o'clock postmeridian August 3: *Provided*, That in the waters of Icy Strait and its tributaries easterly of a line from Point Adolphus to Point Gustavus the closing date shall be 6 o'clock postmeridian August 10.

WESTERN DISTRICT

Salmon fishery.—Regulation no. 6 is amended to read as follows: Commercial fishing for salmon, other than trolling, north of a true line eastward from the southeastern extremity of Point Couverden is prohibited prior to 6 o'clock antemeridian June 15 and after 6 o'clock postmeridian August 13 in each calendar year: *Provided*, That this prohibition shall not apply to the use of gill nets from 6 o'clock antemeridian September 5 to 6 o'clock postmeridian September 30 in Lynn Canal and contiguous waters north of the north end of Sullivan Island, including Chilkat Inlet outside of a line from Green Point passing across the southern shore of Pyramid Island and Chilkoot Inlet 1,000 yards outside the mouth of Chilkoot River.

[*August 10, 1932*]

SOUTHEASTERN ALASKA AREA

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—Regulation no. 6 in supplement no. 251–18–4 is amended so as to open the area to trap fishing between 55 degrees 53 minutes north latitude and 55 degrees 52 minutes 25 seconds north latitude.

[*August 13, 1932*]

KODIAK AREA

Salmon fishery.—Regulation no. 15 is amended to read as follows: Commercial fishing for salmon is prohibited from August 19 to August 31, both dates inclusive: *Provided*, That this prohibition shall not apply (1) to beach seines on the north coast of Kodiak Island from Cape Karluk to Cape Uyak; (2) to set gill nets on the north coast of Kodiak Island from Cape Uyak to West Point; (3) to traps (*a*) on the west coast of Kodiak Island from Chief Point to West Point and on the west coast of Raspberry Island from Raspberry Cape to a point at the entrance to Raspberry Strait at 58 degrees 7 minutes 45 seconds

north latitude, 153 degrees 14 minutes west longitude, (*b*) to traps on Afognak Island, (*c*) to traps on the north shore of the entrance to Moser Bay within 1 statute mile outside of Bun Point, and (*d*) on the east side of Turn Island: *And provided further*, That, except as herein specified, all commercial fishing for salmon in Alitak Bay and all its branches is prohibited after 6 o'clock postmeridian August 10 in each year.

SOUTHEASTERN ALASKA AREA

WESTERN DISTRICT

Salmon fishery.—1. Regulation no. 7 is amended to read as follows: Commercial fishing for salmon, other than trolling, south of a true line eastward from the southeastern extremity of Point Couverden is prohibited prior to 6 o'clock antemeridian July 5, from 6 o'clock postmeridian August 17 to 6 o'clock antemeridian October 1, and for the remainder of each calendar year after 6 o'clock postmeridian October 15.

2. Regulation no. 9 is amended to read as follows: Commercial fishing for salmon by means of any trap is prohibited except in the period from 6 o'clock antemeridian July 5 to 6 o'clock postmeridian August 17 in each year: *Provided*, That such fishing north of a true line eastward from the southeastern extremity of Point Couverden is prohibited prior to 6 o'clock antemeridian June 15 and after 6 o'clock postmeridian August 13 in each calendar year.

EASTERN DISTRICT

Salmon fishery.—1. Regulation no. 7 is amended to read as follows: Commercial fishing for salmon, other than trolling, is prohibited for the remainder of each calendar year after 6 o'clock postmeridian August 17: *Provided*, That commercial fishing for salmon south of 58 degrees north latitude is permitted from 6 o'clock antemeridian October 1 to 6 o'clock postmeridian October 15.

2. Regulation no. 9 is amended to read as follows: Commercial fishing for salmon by means of any trap is prohibited except in the period from 6 o'clock antemeridian June 25 to 6 o'clock postmeridian August 17 in each year.

NORTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation no. 6 is amended to read as follows: Commercial fishing for salmon, other than trolling, is prohibited prior to 6 o'clock antemeridian July 15 in each calendar year, from 6 o'clock postmeridian August 26 to 6 o'clock antemeridian October 1 in each year, and for the remainder of each calendar year after 6 o'clock postmeridian October 15.

2. Regulation no. 7 is amended to read as follows: Commercial fishing for salmon by means of any trap is prohibited except in the period from 6 o'clock antemeridian July 15 to 6 o'clock postmeridian August 26 in each year.

SOUTHERN DISTRICT

Salmon fishery.—1. Regulation no. 6 is amended to read as follows: Commercial fishing for salmon, other than trolling, is prohibited prior to 6 o'clock antemeridian July 5 in each calendar year, from 6 o'clock postmeridian August 19 to 6 o'clock antemeridian October 1 in each year, and for the remainder of each calendar year after 6 o'clock postmeridian October 15.

2. Regulation no. 8 is amended to read as follows: Commercial fishing for salmon by means of any trap is prohibited except in the period from 6 o'clock antemeridian July 5 to 6 o'clock postmeridian August 19 in each year.

[*August 22, 1932*]

SOUTHEASTERN ALASKA AREA

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulation no. 6 is amended to read as follows: Commercial fishing for salmon, other than trolling, is prohibited prior to 6 o'clock antemeridian July 15 in each calendar year from 6 o'clock postmeridian August 30 to 6 o'clock antemeridian October 1 in each year, and for the remainder of each calendar year after 6 o'clock postmeridian October 15.

2. Regulation no. 8 is amended to read as follows: Commercial fishing for salmon by means of any trap is prohibited except in the period from 6 o'clock antemeridian July 15 to 6 o'clock postmeridian August 30 in each year.

[*September 2, 1932*]

KODIAK AREA

Salmon fishery.—All commercial fishing for salmon in the Kodiak area is prohibited for the remainder of the calendar year after 6 o'clock postmeridian September 2.

Revised regulations covering the fisheries of Alaska were issued by the Acting Secretary of Commerce under date of December 20, 1932, copies of which may be secured, without cost, on application to the Bureau of Fisheries, Washington, D.C.

ANNETTE ISLAND FISHERY RESERVE

The Annette Island Packing Co. again operated in the Annette Island Fishery Reserve under its lease from the Department of the Interior.

In 1932 the company operated four traps within the reservation, the catch of which totaled 449,522 salmon; and 774 salmon taken in seines and gill nets within the reserve were purchased from natives. In addition, 97,243 salmon taken outside the reserve and purchased from natives and other independent operators of seines, gill nets, and traps were packed at the cannery. In the operation of the plant and the fish traps employment was given to 19 whites and 168 natives.

EXPERIMENTAL PLANTING OF OYSTERS

In March 1932 the *Murre* and crew assisted B. E. Smith, of Ketchikan, in transporting and planting approximately 300,000 seed oysters of the Japanese variety in waters of the southern district of southeast Alaska. The experiment of introducing the oyster into this region will be watched with interest. It is felt that conditions in parts of Alaska may be as favorable as in the bays of Washington for the development of oysters, and if this proves to be the case, an additional source of food may be established there.

STREAM IMPROVEMENT

In connection with their patrol duties, members of the Bureau's field force gave the usual attention to the improvement and enlargement of salmon-spawning areas. Log jams and a number of abandoned beaver dams were removed in various districts, and passages to permit the ascent of salmon were cut through the obstructions made by active beaver colonies.

The fish ladder in Ketchikan Creek, which had been damaged by flood, was repaired, and the channel of the stream at the head of the ladder was changed by blasting off protruding rocks so that an excellent flow of water was maintained in the structure without the use of a wing dam such as had been installed in previous seasons. Thereafter approximately 900 fish per hour passed through the ladder during the peak of the run.

At the upper falls in McNeil Creek, Kamishak Bay, a fishway was blasted out of the solid rock, through which the fish can pass with-

out difficulty into the creek above. A temporary dam was constructed at the crest of the lower falls in this stream, diverting the water to a side channel of comparatively easy ascent. Some blasting was done at Chinik Creek Falls to facilitate the passage of salmon upstream.

Because of the lack of funds for bounty, the destruction of predatory fishes in the Bristol Bay region was less actively prosecuted than in other recent years. However, Bureau employees stationed there and elsewhere in the Territory, especially those at salmon-counting weirs, destroyed large numbers of predatory trout during the season.

STREAM MARKING

New markers defining areas closed to commercial fishing were erected to replace those which had become illegible or damaged, and changes were made in the positions of others to conform with changes made in the regulations with respect to closed areas.

STREAM GUARDS

The Bureau employed 206 men in 1932 as stream guards and special workmen in connection with law-enforcement duties. Of these, 99 were stationed in southeastern Alaska, 60 in central, and 47 in western Alaska. Some of the temporary workers were engaged for only a few days, but the period of employment generally ranged from 2 to 5 months.

In southeastern Alaska 53 stream watchmen furnished their own launches and were assigned to patrol larger bodies of water or in the vicinity of several streams.

In central Alaska 18 guards were stationed in the Seward-Katalla district, 7 on Cook Inlet, 22 in the Kodiak-Afognak district, 2 at Chignik, and 11 in the Ikatan-Shumagin district. Eleven of these guards, most of whom were in the Seward-Katalla district, provided their own launches.

In western Alaska 42 were on Bristol Bay; and 5, of whom 1 furnished his own boat, were in the Yukon-Kuskokwim district.

There were also 9 special employees engaged in scientific work—3 on herring and 6 on salmon investigations, this work being carried on chiefly in southeastern and central Alaska.

In addition, there were 12 statutory employees, 52 men on the Bureau's vessels, and 11 on the 8 chartered boats.

The foregoing makes a grand total of 290 persons identified with fishery-protective work in Alaska in 1932 as compared with 312 in 1931.

VESSEL PATROL

Fifteen vessels owned by the Bureau were engaged in fishery-patrol work in Alaska in 1932. Of these, the *Widgeon*, *Murre*, *Auklet*, and *Petrel* were used in southeast Alaska throughout the season; the *Kittiwake* in the Seward-Katalla district; the *Blue Wing* and *Red Wing* in the Kodiak-Afognak area, where the latter also served as tender for the Afognak hatchery; the *Ibis* at Chignik; the *Scoter* on Bristol Bay; and the *Coot* on the Yukon River. The *Crane* patrolled the Alaska Peninsula area and transported Bureau employees and supplies between Seattle and Bristol Bay at the

beginning and end of the season. After its arrival from Seattle in May the *Eider* engaged in patrol work along the Alaska Peninsula for a number of weeks and was then transferred to the Kodiak-Afognak area. The *Teal* was on duty at Cook Inlet until the middle of August and later assisted with the patrol and stream inspection in southeast Alaska.

The *Brant* was used in general supervisory work, chiefly in southeast Alaska. The *Merganser*, which was formerly used in the Ikatan-Shumagin region, did not participate in the fisheries patrol in 1932 but was used as local tender for the Yes Bay hatchery, while the *Puffin* (a vessel approximately 25 feet in length), which it replaced, was transferred to patrol duty in the vicinity of Ketchikan. Eight small boats were operated by the Bureau in the patrol of Bristol Bay. These included an outboard-motor speed boat, especially constructed for work in this region in conjunction with the *Scoter*.

In addition to the vessels owned by the Bureau of Fisheries, eight boats were chartered for patrolling fishing areas, as follows: *Gordon D*, *Valkyrie*, *Gazelle*, and *Lady Luck* in southeast Alaska; *Katherine L* and *Prospector* on Copper River and Prince William Sound, *Harlequin* at Port Valdez, and *Auk* in the Shumagin Islands region and neighboring waters along the Alaska Peninsula.

COMPLAINTS AND PROSECUTIONS

The limited demand and low prices paid for salmon, combined with a general abundance of the fish in virtually all waters open to fishing, were conducive to a closer observance than usual of the laws and regulations for the protection of the fisheries.

In southeastern Alaska a floating trap of the Nakat Packing Corporation at Niblack Point was seized on July 17 for having the heart walls up and tunnel open during the weekly closed period, but in view of extenuating circumstances the company was not prosecuted. In one or two instances it was necessary to warn seiners away from closed areas, but the infringements were not of a seriousness to warrant further action.

The operator of the gas boat *Era T-1544* was arrested near the entrance to Salmon Bay for carrying on board a small purse seine 35 fathoms long, in violation of the regulation limiting the minimum length of purse seines to 150 fathoms. On trial he pleaded guilty, signed release of the seine, and was given a 6-month suspended sentence and fined $3.95 to cover court costs. A gill net with 285 red salmon was found anchored near the mouth of a salmon stream at the head of Salmon Bay. The owner was not apprehended, but the net was seized and the fish were sold for $28.50, which amount was turned over to the Department of Justice.

Twenty-four persons charged with illegal fishing were tried before the United States commissioner at Cordova. Of these, 18 pleaded guilty to having taken undersized clams and were assessed fines ranging from $25 to $45 and aggregating $595. Three of the defendants, in default of payment of the fines, were committed to the Federal jail. The clams that had been seized when the arrests were made were sold to local canneries and the proceeds were turned over to the Department of Justice. Three persons were arrested for fish-

ing for salmon in closed waters of the Copper River area. The case against one of these defendants was dismissed and fines of $25 each were imposed on the others. A fisherman charged with using a salmon gill net in closed waters of the Copper River area and with attaching said net to an anchored power boat pleaded guilty and was fined $25 on each of two counts, and two fishermen were fined $25 each for fishing in that area during a weekly closed period.

Twelve minor violations were reported in the Bristol Bay area, but no charges were prosecuted. The nature of these violations was that fishing boats were above the markers at night and that nets were put in the water a few minutes before the end of a closed period.

DECISION REGARDING LICENSE FEE FOR NONRESIDENT TROLLERS

In a second appeal on the case regarding the validity of the nonresident trollers' tax, which has been in controversy since 1929, a decision was rendered by Judge Wilbur of the Circuit Court of Appeals for the Ninth Circuit on December 12, 1932, holding that the imposition of a license fee of $250 upon all fishermen regardless of whether they fish for 1 hour or 1 year, and regardless of the catch, is an infringement of the right to fish granted by Congress. The district court was directed to enter a decree permanently to enjoin the Territory from collecting the $250 license fee from nonresident troll fishermen.

TERRITORIAL LICENSE TAX

Fisheries license taxes were collected by the Territory under the General Revenue Law of 1921, as amended in 1923, 1925, and 1927. A statement from W. G. Smith, Territorial treasurer, under date of May 8, 1933, gives the collections made to that date for the year 1932. It was stated that collections under the several schedules were fairly complete, although a considerable number of the fisheries companies had not yet made settlement and the amount delinquent was larger than usual because of poor market conditions. The outstanding salmon pack taxes, including some gear taxes, amounted to approximately $66,000; while about $4,000 was still to be collected on fish oil and fertilizer, and $7,500 under the whale-oil and fertilizer schedule.

Fishery license taxes collected by Territory for fiscal year ended Dec. 31, 1932

Schedule	Division no. 1	Division no. 2	Division no. 3	Total
Salmon canneries (pack)	$102,155.45		$394,472.12	$496,627.57
Clam canneries			784.20	784.20
Salteries	2,025.71	$156.83	2,164.00	4,346.54
Cold-storage plants	675.00			675.00
Fresh-fish dealers	1,272.03		8.00	1,280.03
Fish-oil works and fertilizer and fish-meal plants	16,336.40		3,850.25	20,186.65
Fish traps	80,678.55		52,326.45	133,005.00
Gill nets	317.50	27.00	3,581.00	3,925.50
Seines	1,735.00		1,545.00	3,280.00
Total	205,195.64	183.83	458,731.02	664,110.49
Salmon canneries (net income), not possible of segregation as to judicial division				1,106.95
Total collections				665,217.44

WATER-POWER PROJECTS IN ALASKA

Eight applications for licenses for minor power projects in Alaska were referred to the Bureau by the Federal Power Commission for report as to whether their operation would be detrimental to the fishing interests and whether any special conditions for the protection of migratory fish should be included in the licenses, if issued. These applications were for projects located at the following places: (1) and (2) Baranof River, within Tongass National Forest; (3) an unnamed stream at Ward Cove, Revillagigedo Island; (4) Hanley Creek, McClure Bay; (5) Sahlin Creek, Sheep Bay; (6) San Juan Lake and Creek, Evans Bay, Evans Island; (7) Stevens Creek, Orca Inlet; and (8) an unnamed stream on the west shore of Upper Trail Lake, within Chugach National Forest.

Upon the basis of information from field agents of the Bureau the Commission was notified with respect to each case that the stream in question was not a spawning ground for salmon, and that therefore the Bureau had no objection to the utilization of the waters for power development.

KUSKOKWIM RIVER

A limited amount of fishing for export was again carried on off the mouth of the Kuskokwim River, where three companies were engaged in the industry during part of the season. Their total output was 175 barrels of pickled salmon, chiefly chums, kings, and reds, and 137 tierces of mild-cured kings. Stream Guard Charles McGonagall patrolled the fishing grounds from May 29 to August 22. Three hundred and seventy-two natives fished in the river for local requirements, using 498 gill nets of 7,470 fathoms, 51 wheels, and a number of small boats. They prepared 485 tons of dried chums.

YUKON RIVER

Commercial fishing off the mouth of the Yukon River was permitted in 1932 for the first time in 8 years. During the 15-day open season employment was given to a number of natives by two operators who prepared mild-cured salmon for the outside market. Approximately 80 tierces of this product were shipped to Seattle.

As in previous years, a patrol of the river was maintained by Inspector C. F. Townsend and a stream guard throughout the season. Reports indicate that the run of chums was the best ever known on the Yukon, and the catch was about double that of 1931. The natives of the lower Yukon had suffered great hardship in the winter of 1931–32, as they lost much of their supply of fish, as well as a number of small boats and other equipment, when the tundra from Point Romanoff to Cape Newenham was flooded by two high tides in December.

Products of the Yukon and Tanana fisheries, including the commercial output, were as follows: 130 cases of kings canned and 2,064 pounds of canned smoked kings, 82 tierces of mild-cured kings, 8,150 pounds of kings and 3,185 pounds of chums pickled, and 710 tons of dried chums. Apparatus consisted of 232 wheels, 94 gill nets of 1,296 fathoms, 1 motor vessel of 40 tons, 2 launches, 1 power dory, 1 scow, 4 gill-net boats, and miscellaneous small boats. There were 13 whites and 323 natives engaged in the fishery.

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WEIRS FOR COUNTING SALMON ESCAPEMENT

The operation of weirs for counting the number of salmon that ascend particular streams to spawn provides a means of regulating the commercial catch to insure an adequate escapement of brood fish and furnishes information of value in connection with scientific studies, especially with reference to their practical application in the forecasting of the probable size of the run at the end of the succeeding cycle. Twenty-seven weirs were established in typical salmon streams of Alaska in 1932, of which 5 were in southeastern, 17 in central, and 5 in western Alaska.

Reports of operations of the various weirs and of the counts of salmon in 1932 are as follows:

ANAN CREEK

During the construction of the rack in Anan Creek and at several times throughout the season heavy rains caused the stream to rise far above the normal level, interfering with the work at the weir, although no serious damage was done to the structure. The run of pink salmon this year was considerably later than usual, and the fish were small. The main run was from August 6 through August 14, during which period 53,201 pinks were counted. The total count for the season was 132,351 pink salmon, 2,015 cohos, 93 kings, 80 chums, 15 reds, and 36 steelheads. It was estimated that an additional 3,000 pink salmon spawned during the latter part of the season in the area between the first and second falls. Kenneth C. Lewis was the weir foreman, under the direction of Assistant Agent S. A. Baker.

KLAWAK CREEK

A weir in Klawak Creek at the same location as in previous years was completed on May 30. Red salmon began to pass through the gates on the following day. Although the run of this species was light during the month of June, it was fairly steady through July and August, and the total escapement was much larger than it has been for several years. The first pink salmon were counted on July 28, and cohos and chums appeared a few days later. The run of pinks was not heavy, but chums were unusually abundant. Counting was continued through October 6, when the total escapement numbered 57,294 reds, 181,734 pinks, 264,793 chums, and 7,052 cohos. Ernest Petry was in charge of counting operations, under the supervision of Warden C. L. Olson.

STANEY CREEK

Construction of the Staney Creek weir was begun on July 1 and completed on July 4. Heavy rains throughout the summer made the operation of the weir difficult, and after September 1 the water was so high and discolored that counting could not be continued. The total count for the season was 102,463 pink salmon, 2,898 cohos, and 29,663 chums. It was estimated that 50,000 pinks, 8,000 cohos, and 20,000 chums were schooled below the weir at the time counting ceased. Anton Rex was the weir operator at this place, under the supervision of Warden C. L. Olson.

OLIVE COVE

The building of the Olive Cove weir and of a special enclosure to hold fish for scientific study was begun on June 17 and completed on June 28. The first salmon passed through the weir on July 18, and the main part of the run ascended between July 23 and July 27. Counting was continued to September 7, when the total escapement consisted of 19,086 pink salmon, 1,047 chums, 71 cohos, and 6 reds. It was estimated that approximately 1,200 pink salmon spawned in the stream below the weir, in addition to the above actual count. Walter Campen performed the work at this place under the direction of Assistant Agent S. A. Baker.

SITUK RIVER

The counting of salmon at the Situk River weir began on June 10 and was continued through August 27, the total number tallied being 139,191 red salmon, 95,231 pinks, 1,978 kings, and 826 cohos. Twice in July the weekly closed period was extended 24 hours in order to permit an escapement of at least 50 percent of the run to the spawning grounds. The Bureau's work here was under the supervision of Warden Harry A. Pryde.

OLSEN BAY

Severe rains throughout the season interfered with the operation of the Olsen Bay weir, preventing a complete count of the salmon escapement. The run of chum salmon was earlier and larger than in the preceding year, but pink salmon were about a week later than usual. From June 28 to August 13 there were counted 3,368 chums and 331 pinks. Frank Cole was the operator of this weir, under the supervision of Warden N. O. Hardy.

ESHAMY RIVER

The weir at Eshamy River was erected on June 21. Counting began on the following day and was continued through September 22, at which time the total escapement numbered 229,668 red salmon, 41 kings, 6,372 cohos, and 3,773 pinks. W. B. Harris, under the direction of Warden N. O. Hardy, carried on the work at this place.

JACKPOT RIVER

A new 120-foot weir of the usual tripod type, with 4 counting gates, was built in Jackpot River at the lower end of the second lake. The system of lakes drained by this river has extensive spawning beds, which for adequate seeding require a much larger escapement than was recorded this season. From July 1 to September 4, inclusive, there were counted 5,401 red salmon, 1,376 cohos, 6,793 pinks, 134 chums, and 13 kings. It was estimated that approximately 30,000 pink salmon were still in the river below the weir at the time the structure was removed. Oscar Hutton was the operator, under the direction of Warden N. O. Hardy.

BEAR CREEK

In order to obtain a count of red salmon entering the streams at the head of Resurrection Bay a weir was placed in Bear Creek and

a small auxiliary weir was operated for about a month in Grouse Creek near by. The total count of red salmon in those streams from June 5 to July 16 was 32,399 in Bear Creek and 205 at Grouse Creek. This escapement is considered satisfactory for proper seeding. The Bear Creek Weir was closed after the run of red salmon had ended, in order to prevent the ascent of other species that might disturb the red salmon spawn. R. C. Johnson was in charge of the weir work, under the supervision of Warden N. O. Hardy.

ALITAK BAY

Weirs for counting the escapement of spawning salmon in the Alitak Bay district were again operated in four streams tributary to Olga Bay. Red salmon began to appear at the cannery station weir on May 16, at the upper station weir on May 31, at Silver Salmon Creek on July 4, and at Horse Marine Lagoon on July 10. All of the weirs were removed by the close of September 17, at which time the total escapement of red salmon was 265,139, of which 182,941 were tallied at the upper station, 68,106 at the cannery station, 2,014 at Silver Salmon Creek, and 12,078 at Horse Marine Lagoon. In addition, 19,213 pink salmon and 7,336 cohos were counted through the weirs. About 4,000 reds were in the lagoon at the cannery station and a good showing of cohos at all stations when counting was discontinued. The reported commercial catch of red salmon was 167,480. As the escapement into Olga Bay was good considering the size of the run, it was necessary to close the traps at the entrance to Moser Bay for 1 week only, from July 31 to August 6. Dolly Varden trout were not numerous in the Olga Bay tributaries during the season, and a large percentage of those that entered the streams were caught in traps near the weirs and were destroyed. The Bureau's work at Alitak was in charge of Henry B. Looff, under the supervision of Warden H. H. Hungerford.

AYAKULIK OR RED RIVER

A few red salmon and kings were noted passing upstream before the completion of the Red River Weir, where the first count was made on May 29. Throughout June and July the escapement of red salmon was good, decreasing gradually after August 9. Beginning on July 8, an unusually heavy run of pink salmon ascended, and large numbers were still coming up the river when counting operations were discontinued at the close of August 17. High water and the large number of spent salmon brought downstream made it necessary to remove the weir at that time. The total count for the season was 732,346 red salmon, 1,005 kings, and 2,990,505 pinks. Henry B. Looff was in charge of operations at this place, under the general supervision of Warden H. H. Hungerford.

UGANIK RIVER

The count of salmon ascending Uganik River began on June 8 and continued through August 26, except for the period from June 19 to July 9, inclusive, when a freshet prevented the operation of the weir. The total count for the season was 25,808 red salmon, and it was estimated that there was an escapement of 10,000 of that

species during the high-water period. Large numbers of pink salmon also entered the river; but they were not counted, as the majority of them spawn in the river and sloughs below the weir. The work at this place was performed by H. S. Danielson under the direction of Warden H. H. Hungerford.

KARLUK RIVER

The first salmon were counted through the Karluk Weir on May 22, but it was not until June 5 that an escapement of any appreciable size was recorded. Because of the light run, fishing was not started in the Karluk district until June 6. Toward the end of July pink salmon appeared in large numbers off the mouth of the river; and in order to prevent too many of them from ascending to the spawning grounds commercial fishing was continued until the run slackened. Of the pink salmon that escaped capture, the greater part spawned in the lower 18 miles of the river below the portage, and only a few reached the lake. The Karluk area was closed on August 13, and on August 22 it was reopened so that a larger sample of the return of marked red salmon might be obtained for scientific study. Within a few days, however, the commercial catch of reds for the season had so far exceeded the escapement that it was necessary to close the area on August 27 for the remainder of the season. The total count at the weir to the close of October 5 was 737,772 red salmon, 1,439,744 pinks, 26,392 cohos, and 6,290 kings. The reported commercial catch of red salmon was 601,253. Counting operations were carried on by Harry D. Baer for several weeks and by H. Olafson for the remainder of the season, the work being under the direction of Warden H. H. Hungerford.

KAFLIA BAY

From June 14 to August 20, inclusive, 20,751 red salmon were counted through the weir in the stream at the head of Kaflia Bay. John Gilbert was in charge of operations, under the direction of Warden H. H. Hungerford.

ENGLISH BAY

The counting of salmon at the English Bay weir began on May 25 and was continued through August 2, when the total escapement numbered 22,991 red salmon. A good showing of pink salmon and a few reds were in the lagoon at the time the weir was removed on August 3. Work at the weir was carried on by Jack Tansy, under the direction of Capt. R. L. Cole.

KALGIN ISLAND CREEK

A count of salmon ascending on daylight tides was again made at Kalgin Island Creek by the stream guard stationed at that place. From June 1 to August 6 there were counted 19,280 red salmon and 5,610 cohos. It was estimated that about 1,000 reds had passed upstream before counting began. Predatory trout were not numerous in the bay until toward the close of the salmon run. In the week ending August 6, 991 trout were destroyed. Lee Waddell, under the supervision of Capt. R. L. Cole, performed the work here.

CHINIK CREEK

The counting weir in Chinik Creek was erected on June 8, at which time a few red salmon were observed outside in the inlet. They began to collect at the mouth of the stream on June 19, the numbers increasing until the waters at high tide within one-half mile of the falls were teeming with salmon. From July 1 to July 24 there passed through the weir 53,012 red salmon, the peak of the run being on July 11. James A. Hart was the weir operator, under the direction of Capt. R. L. Cole.

CHIGNIK RIVER

The Chignik Weir was erected at about the same location as in 1922 and was ready for operation on May 18. The red-salmon run began to pass upstream on June 2, gaining rapidly in volume thereafter and reaching its peak on June 22, when 237.212 fish were counted at the weir. By the end of June the escapement was more than 2,300,000. Counting was continued through September 29, at which time the total escapement for the season was 3,185,926 red salmon, 23,531 cohos, and 2,223 kings. This is by far the largest escapement that has been recorded at the Chignik Weir. No count was made of the pink and chum salmon, as most of these species spawn in streams emptying into the bay and lagoon below the weir. Pink salmon were more abundant than in any other year since 1926, but the run of chums was light and the fish were small. The seaward migration of young salmon during the season was light.

The three canneries that have operated at Chignik for a number of years combined operations in 1932, putting up their entire pack at one plant. A new operator entered the district and erected a small cannery on the west side of Chignik Lagoon, which was in use during the latter part of the season. The total reported commercial catch of red salmon from the Chignik run was 1.501.677. Warden Charles Petry was in charge of the Bureau's work at Chignik.

ORZENOI RIVER

From June 25 to August 15, inclusive, 25,706 red salmon were counted through the weir in Orzenoi River, the peak of the run being on July 11, when 2.239 salmon passed upstream. The weir was operated by Roy A. Buck, under the direction of Capt. J. J. O'Donnell.

MORZHOVOI BAY

The Morzhovoi Weir, on the salmon stream emptying into Middle Lagoon, was put into operation on June 26. The run began on June 30 and continued through September 8, when the total count numbered 40,306 red salmon. Harry Hegman had charge of this weir, under the direction of Capt. J. J. O'Donnell.

BEAR RIVER

The weir in Bear River, on the north side of the Alaska Peninsula, was ready for operation on May 18. Before the salmon run began, 54,820 predatory trout were taken in a trap above the weir. The first salmon ascended on June 5, but it was not until June 24 that

they appeared in appreciable numbers. The largest escapement for any one day was on August 3, when 24,277 red salmon were tallied. At the close of August 25, when counting was discontinued, the total escapement was 219,831 red salmon, 1,768 chums, 451 pinks, 25 kings, and 1 coho. As this weir is 5 miles from the mouth of the river the number of salmon tallied, other than reds, is but small as compared with those that spawn between the weir and the beach. Teander Olson carried on the counting operations under the direction of Capt. J. J. O'Donnell.

UGASHIK RIVER

The weir in Ugashik River was in the same location as in previous years. Counting began on July 8 and was continued through August 11, when 600,648 red salmon had passed upstream. The record count for any one day was 71,409, on July 15. In addition to the red salmon, 1,210 chums, 118 cohos, 112 pinks, and 24 kings were tallied through the weir. Operations here were in charge of Henry McFadden under the supervision of Agent Dennis Winn.

EGEGIK RIVER

A new weir of the usual tripod and picket type was erected in Egegik River, the material having been assembled in the previous season and transported to the site, which is about 24 miles upstream, near the foot of the rapids, where the river is 790 feet wide. While the construction was going on the greatest depth of water was 5½ feet, but later in the season it was approximately 3 feet higher. The weir was completed on June 23, and a camp for the weir crew was also established. The run began to pass through the counting gates on June 26 and reached its peak on July 18, when 278,225 red salmon were tallied for the day. Counting was continued through August 9, at which time the total escapement was 2,033,102 red salmon, 522 chums, and 103 kings. William E. Sullivan was in charge of the weir, under the direction of Agent Dennis Winn.

NAKNEK RIVER

The Naknek River weir was in place and ready for operation several days before the first salmon passed upstream on June 23. By the end of June more than 100,000 had been tallied, and the run continued in good numbers throughout the following month, reaching its peak July 13, on which date 308,675 red salmon passed through the weir. Counting was continued through August 10, when the total escapement consisted of 1,457,301 red salmon, 1,869 kings, 102 cohos, 210 chums, and 396 pinks. Adrian Youngsman had charge of the weir operations under the supervision of Agent Dennis Winn.

KVICHAK RIVER

The operation of a weir in Kvichak River at a new site about 60 miles above Koggiung proved highly successful. Here two islands, each approximately one-half mile long, divide the river into three channels. An electric screen, 660 feet in length and similar to that used in the Kvichak weir in 1930, was constructed across the middle channel at the lower ends of the islands, diverting the salmon runs

to the side channels. The other sections of the weir were of tripod and picket construction and extended from the upper ends of the islands to the mainland, the right-channel section being 230 feet long and the left-channel section 550 feet long. Twenty-one counting gates 18 inches wide and a boat gate 50 feet wide were built in the weir. The boat gate was in the middle section near Left Island and consisted of two booms carrying electrode chains, from which the current could be shut off by a convenient switch while the boats were passing through. The power house was on Right Island.

Only a few salmon ascended the river before the weir was in operation. Counting began on June 28, but it was not until July 2 that the fish appeared in any numbers. For nearly 3 weeks thereafter the run was continuously heavy except for one comparatively slack period on July 12 and 13. On each of 2 successive days, July 8 and 9, more than 460,000 red salmon were counted, and the largest count for any one day was 482,396, on July 17. At the close of August 5, when counting was discontinued, the total number tallied was 5,064,014 red salmon, 5,753 kings, 1,020 chums, and 200 pinks. Robert Holcomb was in charge of the weir under the direction of Agent Dennis Winn.

SALMON LIFE-HISTORY STUDIES

The investigation of the biology of the Alaska salmon was carried on under the general direction of Joseph A. Craig, who spent some time in Alaska during the summer, and advice and assistance were had from Dr. Willis H. Rich, of Stanford University.

Because of the limitation of funds only three major projects were actively continued—those pertaining to the red salmon at Chignik and Karluk by Harlan B. Holmes and Joseph T. Barnaby, respectively, and that dealing with the pink salmon of southeastern Alaska by Dr. Frederick A. Davidson. The work at Chignik and Karluk included a careful sampling of the runs of adult fish, and the undertaking of additional experiments in which the small fish on their seaward migration were marked by the removal of certain fins. In southeastern Alaska studies of the pink salmon were continued to determine the application of the parent stream theory to the life history of this species. A full report of the investigations is published in a separate document.

OBSERVATIONS ON THE ESCAPEMENT OF SALMON

Continuing a policy that has been demonstrated to be of value in formulating regulations necessary to prevent depletion of the salmon fishery, members of the Bureau's field force carefully observed the salmon runs throughout the 1932 season and subsequent to the close of commercial fishing operations. Most of the important streams in all districts were visited, and reports show that conditions in general were good, the escapement of all species fully meeting the requirement of law that not less than 50 percent of the run shall be permitted to escape to the spawning grounds.

Southeast Alaska.—In the southern and north Prince of Wales Island districts the run of pink salmon was considerably later and the fish were less abundant than in 1931, but the distribution to the

streams was more even. A most encouraging feature was the marked improvement in the size of the spawning fish, as compared with those that ascended the streams in 1930. The peak of the run along the Cape Fox shore was not reached until nearly the end of July, but from that time until the close of commercial fishing on August 19 there was a steady run of good proportions. The largest and most consistent run in the district occurred from the Percy Islands northward along the western shores of Annette and Gravina Islands to Vallenar Rocks, and toward the latter part of the season pinks were unusually abundant on the east shore of Prince of Wales Island and along Cleveland Peninsula in Clarence Strait. Karta River, McDonald Lake, Thorne River, and other red-salmon streams had the best escapement of red salmon they have had for years, while nearly all streams were heavily seeded with chums.

Conditions on the west coast of Prince of Wales Island were essentially the same as in the southern and north Prince of Wales Island districts, except that the run of chums was larger. The escapement of pink salmon was sufficient for proper seeding. A marked increase in the number of red salmon was observed in this area, as well as in Sumner Strait, Bradfield Canal, Ernest Sound, and contiguous waters. The escapement of pinks in the last-named regions, although not so generally satisfactory as in the more southerly streams, was adequate except in a few places, while chums showed a marked increase over 1931.

In the Icy Strait, western, and eastern districts pink salmon did not appear in large numbers until late in July. Thereafter, however, they were abundant and all streams were well seeded. The escapement of chums and reds was excellent, and the coho run was above the average for recent years. The Yakutat district had a generally satisfactory escapement of salmon in all spawning areas.

Prince William Sound and Copper River region.—From the inspection of spawning grounds in the Prince William Sound area it appeared that the escapement of pink salmon this season was larger than that for 1930, which was for the most part very satisfactory. The Port Wells region, however, was again poorly seeded. A heavy run of red salmon entered Eshamy Lake, and good escapements of this species were reported also in the Copper River system, the Bering and Martin Rivers, Eyak Lake, and most of the red-salmon streams in Prince William Sound.

Cook Inlet.—In general, the escapement of all species of salmon was good throughout the Cook Inlet area, contrasting strongly with the inadequate and irregular runs of the previous year. With high water in the streams during the greater part of the season, the fish were able to reach many hitherto inaccessible spawning grounds. An unusually heavy early run of reds occurred in some sections, notably in the Kenai and Kasilof Rivers, and the escapement of this species in Chinik Creek was more than 50 percent larger than in 1931. At the English Bay and Kalgin Island streams the escapement compared favorably with that of previous years, but the run was somewhat below normal in some of the streams south of Bluff Point. Pinks and cohos were abundant in all parts of the district, and the escapement of kings was well above the average in most of the important streams harboring this species.

Kodiak-Afognak district.—A considerable improvement was manifest in the red-salmon run in many of the streams in the Kodiak-Afognak region. Escapements of this species in Red River, and Kaflia, Uganik, and Ugat Bays were much larger than in the previous year, but the Alitak and Karluk runs were lighter than usual. A further increase was noted in the number of red salmon that ascended Buskin and Eagle Rivers, as compared with former years. Pink salmon were more abundant than in any even year since 1926, although their arrival, as in other districts, was later than usual. The coho run was normal, but chums were less numerous than for several years.

Chignik.—The red-salmon run at Chignik was by far the largest recorded since the counting weir was first established in 1922. Cohos were not as numerous as in the previous year, but pink salmon were more abundant than in any other season since 1926. The run of chums was light and the fish were small.

Alaska Peninsula.—Good runs of salmon entered the Alaska Peninsula waters and virtually all spawning grounds were well seeded. Chum salmon were abundant in Herendeen Bay on the north side of the Alaska Peninsula, and there were good runs of reds at Nelson Lagoon and in Bear River. The weir counts at Orzenoi and Morzhovoi Bays, on the south side of the peninsula, showed an increase over previous years in the escapement of red salmon. Ikatan Bay and Morzhovoi Bay were well stocked with pinks and chums, and it was reported that streams between Kupreanof Point and Castle Cape also had heavy escapements of these species. In Belkofski, Volcano, and Pavlof Bays the run of pinks was heavy and chums fair. All spawning streams of the Shumagin Islands were adequately seeded.

Bristol Bay.—In nearly all parts of the Bristol Bay district the escapement of red salmon equaled or exceeded that of 1931, which was one of the most satisfactory on record. The heaviest runs entered the Kvichak and Naknek Rivers; seeding was normal in the Egegik system, but was considered only fair in the Ugashik and Nushagak areas. The Wood River region had a smaller escapement than any other section of the Bristol Bay district, but investigation indicated a fair seeding of the spawning grounds.

HATCHERIES

EXTENT OF OPERATIONS

Salmon propagation in Alaska was continued at the Government's hatcheries at Afognak and McDonald Lake and at the privately owned hatchery of the Northwestern Fisheries Co. on Hugh Smith Lake.

During the year these hatcheries produced and liberated in Alaska waters 58,304,212 young red salmon from the eggs that had been collected in 1931. Of this number 19,920,712 were from the Afognak hatchery, 18,980,500 from the McDonald Lake hatchery, and 19,403,000 from the private hatchery at Hugh Smith Lake. At two of the hatcheries the young salmon were released as fry, but at McDonald Lake they were held and fed with salmon scrap that had been obtained from nearby canneries and frozen at the cold-storage plant

of the New England Fish Co. at Ketchikan without cost to the Government. Fingerlings nos. 2, 3, and 4 were released in Lake McDonald during the period from July to November, inclusive.

At the McDonald Lake hatchery there were received on March 8, 1932, for incubation, 50,000 eastern brook-trout eggs, from which 36,000 no. 2 fingerlings were produced and distributed in various lakes of southeast Alaska in the following September. The McDonald Lake hatchery also produced and liberated 317,000 pink-salmon fry from eggs taken in 1931.

Egg collections in 1932 were as follows: At Afognak, 19,151,800 red-salmon eggs and 2,524,500 pink-salmon eggs; at McDonald Lake, 25,500,000 red-salmon eggs and 558,000 pink-salmon eggs; and at the private hatchery on Hugh Smith Lake, 25,895,000 red-salmon eggs.

In October 379,904 eyed pink-salmon eggs and 3,010,650 eyed red-salmon eggs were forwarded to Seattle from McDonald Lake, the former for the State of Washington and the latter for Oregon, and a shipment of 2,228,000 eyed pink-salmon eggs was sent from Afognak to Seattle in November for the State of Washington.

Operations of Federal and private hatcheries in Alaska in 1932

Location of hatchery	Red or sockeye salmon		
	Eggs taken in 1931	Salmon liberated in 1932	Eggs taken in 1932
Afognak	23,054,720	19,920,712	[1] 19,151,800
McDonald Lake	25,000,000	18,980,500	[2] 25,500,000
Hugh Smith Lake (Quadra)	20,280,000	19,403,000	25,895,000
Total	68,334,720	58,304,212	70,546,800

[1] Also 2,524,500 pink-salmon eggs were collected, of which 2,228,000 in the eyed stage were shipped to Seattle in November for the State of Washington.

[2] Also 558,000 pink-salmon eggs were collected. Shipped 379,904 eyed pink-salmon eggs and 3,010,650 eyed red-salmon eggs to Seattle in October, the former for the State of Washington and the latter for Oregon.

HATCHERY REBATES

The owners of private salmon hatcheries in Alaska who are also packers of canned salmon receive a rebate on license fees and taxes of every nature on their catch and pack of salmon at the rate of 40 cents per 1,000 king or red-salmon fry liberated by them in Alaska waters. In the fiscal year ended June 30, 1932, only one such private salmon hatchery was operated—that of the Northwestern Fisheries Co. at Hugh Smith Lake—and the rebate due on the 19,403,000 red-salmon fry liberated there during the year amounted to $7,761.

GENERAL STATISTICS OF THE FISHERIES

The total number of persons engaged in the fisheries of Alaska in 1932 was 20,122, or 2,455 less than in 1931. Fishery products were valued at $25,028,920, a decrease of $8,565,832, or 25 percent, from the preceding year. Of the total amount, 90.3 percent represented the value of salmon products; 4.7 percent herring; 2 percent halibut; 1.8 percent clams; and 1.2 percent the value of all other fishery products.

Summary of persons engaged and products of the Alaska fisheries in 1932

Items	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PERSONS ENGAGED								
Whites	3,695		3,539		3,407		10,641	
Natives	2,542		1,103		1,371		5,016	
Chinese	131		180		374		685	
Japanese	351		200		259		810	
Filipinos	776		672		550		1,998	
Mexicans	17		28		854		899	
Negroes	1				51		52	
Miscellaneous	2		3		16		21	
Total	7,515		5,725		6,882		20,122	
PRODUCTS								
Salmon:								
Canned—cases	2,208,053	$7,250,249	1,624,598	$6,760,557	1,421,832	$7,704,995	5,254,483	$21,715,801
Mild cured—pounds	4,241,600	446,035	17,600	660	175,200	14,809	4,434,400	461,504
Pickled—do	16,200	940	117,275	7,909	171,935	11,780	305,410	20,629
Fresh, for food—do	1,095,913	70,574					1,095,913	70,574
Frozen, for food—do	6,116,921	226,204					6,116,921	226,204
Fresh, for halibut bait—do	108,900	330	7,600	38			116,500	368
Frozen, for halibut bait—do	50,000	200					50,000	200
Dried and smoked—do			770	85	2,390,000	96,258	2,390,770	96,343
Smoked and packed in oil—cases	30	288	32	640	43	430	105	1,358
Fertilizer—pounds	500,000	7,500	347,285	3,560			847,285	11,060
Oil—gallons	22,000	1,760	17,821	4,010			39,821	5,770
Halibut:								
Fresh—pounds	11,478,568	427,181	13,933	945			11,492,501	428,126
Frozen—do	2,051,795	64,366	8,000	560			2,059,795	64,926
Herring:								
Fresh, for bait—do	2,806,210	25,490	993,000	7,956			3,799,210	33,446
Frozen, for bait—do	2,687,605	14,496					2,687,605	14,496
Pickled for food: Scotch cure—do	2,680,825	127,698	8,342,150	400,532	1,770,250	90,650	12,793,225	618,880
Roused, for food (bloater stock)—do					422,900	14,520	422,900	14,520
Spiced—do	1,200	200					1,200	200
Dry salted—do					145,470	5,091	145,470	5,091
Meal—do	15,298,179	183,898	3,920,300	46,008			19,218,479	229,906
Oil—gallons	2,057,695	211,818	448,014	44,801			2,505,709	256,619
Cod:								
Dry salted—pounds			74,345	1,746	72,000	1,725	146,345	3,471
Stockfish—do			17,100	1,087	2,500	56	19,600	1,143
Pickled—do			22,468	674	8,550	250	31,018	924
Tongues—do			300	45			300	45

Whale:									
Oil	gallons			736,011	76,379			736,011	76,379
Sperm oil	do			7,208	884			7,208	884
Fertilizer	pounds			2,090,000	13,870			2,090,000	13,870
Clams:									
Canned	cases	20	130	71,375	447,188			71,395	447,318
Whole in shell	dozen			100	50			100	50
Crabs:									
Canned	cases	2,821	21,168	5,733	51,944			8,554	73,112
Meat	pounds	37,968	10,450	28,485	6,294			66,453	16,744
Whole in shell	dozen	760	579	346	519			1,106	1,098
Shrimp:									
Meat	pounds	298,436	113,678	1,000	225			299,436	113,903
Whole in shell	do	1,150	173	1,200	60			2,350	233
Trout:									
Canned	cases	26	117					26	117
Fresh	pounds			4,582	458			4,582	458
Frozen	do	1,416	61	5,100	306			6,516	367
Sablefish:									
Fresh	do	43,705	1,281					43,705	1,281
Frozen	do	12,240	192					12,240	192
Pickled	do	30,774	905					30,774	905
Smelt: Fresh	do			5,100	357			5,100	357
Rockfishes:									
Fresh	do	762	18					762	18
Frozen	do	2,000	30					2,000	30
Total			9,208,009		7,880,347		7,940,564		[1] 25,028,920

[1] These figures represent the value of the manufactured product. It is estimated that the value of the catch, exclusive of whales, to the fishermen was approximately $6,971,000. The round weight of the salmon catch landed by the fishermen was approximately 452,536,000 pounds, and the corresponding figure for herring was about 127,578,000 pounds. The figures given above do not include halibut livers, of which it is estimated there were about 500,000 pounds valued at $60,000 landed at Pacific coast ports in 1932; nor do the cod figures include the offshore catch from waters adjacent to Alaska, which amounted to 3,639,255 pounds of dry-salted cod and 6,400 pounds of tongues, having a total value of $127,458, landed at ports of the Pacific Coast States.

SALMON

Despite the fact that fishing effort was greatly curtailed in 1932, with a marked reduction in the quantity of gear employed, the total catch of salmon was larger than in the preceding year. This indicates the generally satisfactory condition of the salmon runs in virtually all localities. Red salmon were abundant in the Bristol Bay region and in many sections of central Alaska, especially at Chignik, where the fish were exceptionally plentiful. At Karluk, however, the run of reds was below normal. For the Territory as a whole, the only species on which the catch decreased was the pink salmon, and undoubtedly the catch of this species would have been much larger had operations not been affected by adverse market conditions.

The total catch of salmon increased about 2 percent over that for 1931. By districts, southeastern Alaska showed a decrease of approximately 5 percent, while there were gains of 4 and 15 percent, respectively, in central and western Alaska.

There was a decrease of about 37 percent in the number of fathoms of seines and 24 percent in the number of fathoms of gill nets used in Alaska in 1932, as compared with the previous year, while traps decreased 28 percent.

CATCH AND APPARATUS

The total number of seines used in the salmon industry in 1932 was 331, of which 242 were purse seines and 89 beach seines. The purse seines aggregated 39,795 fathoms of webbing and the beach seines 10,955 fathoms. The number of gill nets used was 3,563, having a total length of 197,996 fathoms. There were 150 driven and 193 floating traps—a total of 343.

Southeastern Alaska was accredited with 193 seines, or a total of 34,455 fathoms, a decrease of 99 seines and 17,353 fathoms of webbing from the number used in 1931; also with 158 gill nets, aggregating 12,125 fathoms, a decrease of 157 nets and 6,135 fathoms of webbing; and with 22 driven and 171 floating traps, a decrease of 18 driven and 63 floating traps from the number operated in 1931.

Corresponding figures for central Alaska show 134 seines, or 15,520 fathoms, as compared with 257 seines, or 28,149 fathoms, in 1931; 1,499 gill nets, or 63,105 fathoms, as compared with 1,826 gill nets, or 82,523 fathoms, in 1931; and 127 driven and 22 floating traps, as compared with 177 driven and 25 floating traps in 1931.

In western Alaska, 4 seines, or 775 fathoms of webbing, were used, a decrease from 1931 of 3 seines and 330 fathoms of webbing. There were 1,906 gill nets used, or an aggregate of 122,766 fathoms, a decrease of 457 nets and 38,076 fathoms of webbing. One driven trap was used in this district, as compared with 2 in 1931.

Seines caught 14 percent of the salmon taken in 1932, gill nets 28 percent, and traps 55 percent, while lines and wheels took the remaining 3 percent.

Percentage of salmon caught in each Alaska district, by principal forms of apparatus

Apparatus	Southeast Alaska		Central Alaska		Western Alaska	
	1931	1932	1931	1932	1931	1932
Seines	22	20	28	15	5	5
Gill nets	2	2	9	10	92	90
Traps	73	74	63	75		
Lines	3	4				
Wheels					3	5

The total catch of salmon in 1932 was 75,683,575, an increase of 1,834,893, or about 2 percent, over the number taken in 1931. The central and western districts showed gains of 912,093 and 2,584,805, respectively, while there was a decrease of 1,662,005 in southeast Alaska. By species, the catch of cohos increased 67,355, chums 2,982,648, kings 202,049, and reds 3,748,923, while the catch of pinks decreased 5,166,082.

Salmon taken in 1932, by apparatus and species, in each geographic section of Alaska

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Seines:				
Coho, or silver	86,775	7,711		94,486
Chum, or keta	2,012,563	312,876	48,699	2,374,138
Pink, or humpback	3,961,808	2,555,108		6,516,916
King, or spring	288	709	5,711	6,708
Red, or sockeye	378,041	670,916	903,607	1,952,564
Total	6,439,475	3,547,320	958,017	10,944,812
Gill nets:				
Coho, or silver	143,202	156,980	4,753	304,935
Chum, or keta	12,024	64,321	1,533,284	1,609,629
Pink, or humpback	73,895	552,281	215,472	841,648
King, or spring	25,963	79,228	98,723	203,914
Red, or sockeye	339,629	1,571,051	16,051,235	17,961,915
Total	594,713	2,423,861	17,903,467	20,922,041
Traps:				
Coho, or silver	565,234	532,670		1,097,904
Chum, or keta	3,569,147	1,133,057	1,997	4,704,201
Pink, or humpback	18,569,897	10,307,172		28,877,069
King, or spring	4,847	47,948	556	53,351
Red, or sockeye	934,395	5,987,513	62,747	6,984,655
Total	23,643,520	18,008,360	65,300	41,717,180
Lines:				
Coho, or silver	594,195			594,195
King, or spring	595,747			595,747
Total	1,189,942			1,189,942
Wheels:				
Chum, or keta			887,000	887,000
King, or spring			22,600	22,600
Total			909,600	909,600
Total:				
Coho, or silver	1,389,406	697,361	4,753	2,091,520
Chum, or keta	5,593,734	1,510,254	2,470,980	9,574,968
Pink, or humpback	22,605,600	13,414,561	215,472	36,235,633
King, or spring	626,845	127,885	127,590	882,320
Red, or sockeye	1,652,065	8,229,480	17,017,589	26,899,134
Grand total	31,867,650	23,979,541	19,836,384	75,683,575

CANNING

CHANGES IN CANNERIES

Two canneries in southeast Alaska that had been closed in 1931—the Douglas Island Packing Co.'s plant at Douglas, and the Wrangell Narrows Packing Co.'s plant at Scow Bay—were reopened and operated under lease by the Ellson Packing Co. and O. Nicholson, respectively. Libby, McNeill & Libby leased the Kake cannery of the Alaska Pacific Salmon Corporation and operated it in lieu of its Taku Harbor plant, which was destroyed by fire. In the spring the United Salmon Packers, Inc., bought the Skowl Arm plant, which they had operated under lease in 1931, and changed the corporate name to Skowl Arm Packing Co.

As in the previous year, joint operations were carried on by a number of plants for purposes of economy. With few exceptions such arrangements involved no change in business organization. The Standard Packing Co. was formed to carry on the joint operations of the Pioneer Sea Foods Co. and the Shepard Point Packing Co., the canning being done at the latter's plant at Shepard Point.

A new organization, the Strand-Jensen Fisheries, purchased and operated the plant of the Cordova Packing Co., at Cordova. The salmon and clam cannery at Kukak Bay, which had been leased for several years by the Seashore Packing Co., was taken over and operated by the Pioneer Packing Co. The Ikatan plant of the Pacific American Fisheries was reopened. At the close of 1931 the New England Fish Co. relinquished its lease on the Knight Island cannery of the Prince Packing Co. The plant remained idle during the year. H. C. Bennett purchased the cannery of the Toman Packing Co., at Anchorage, which has not been operated since 1930. Operations of the floating cannery *International* at Sand Point were carried on by the Alaska Pacific Salmon Corporation, instead of under the name of Unga Fisheries Co.

NEW CANNERIES

One new cannery, built in July by Harry W. Crosby on the west side of Chignik Lagoon, was in operation during part of the season. A small pack was prepared by Bert Heglund at a hand plant on Halibut Bay, but this plant has not been included in the list of canneries.

CANNERIES NOT OPERATED

A considerable number of plants were not operated in 1932. In addition to the Taku Harbor Plant of Libby, McNeill & Libby and the West Coast Canning Co.'s plant at Tuxedna Bay, both of which burned down before the salmon-canning season began, 31 plants that had been operated in the preceding year were closed in 1932. The Kustatan Packing Co. resumed operations but was engaged chiefly in canning clams and put up very little salmon; therefore it is not included in the list of salmon canneries. Much of the canning machinery of the Karheen plant of Libby, McNeill & Libby has been removed, and it is probable that the cannery will not be reopened. It has therefore been dropped from the list, as has the floating plant *Esther* of the North Pacific Fisheries Co. Other idle canneries are as follows:

Southeast Alaska:	
Alaska Pacific Fisheries	Burnett Inlet.
Alaska Pacific Salmon Corporation	Boca de Quadra.
	Chomly.
	Funter Bay.
	Pybus Bay.
	Rose Inlet.
	Tenakee.
Alaska Packers Association	Loring.
	Wrangell.
Alaska Sanitary Packing Co	Cape Fanshaw.
Columbia River Packers Association	Lake Bay.
Hetta Packing Co	Coppermount.
Hoonah Packing Co	Hoonah.
	Gambier Bay.
Iwersen Packing Co	Ketchikan.
Libby, McNeill & Libby	Klawak.
The Nakat Packing Corporation	Ketchikan.
New England Fish Co	Chatham.
	Ketchikan.
	Noyes Island.
	Yakutat.
Northwestern Fisheries Co	Boca de Quadra.
	Dundas Bay.
	Hunter Bay.
	Kasaan.
	Santa Ana.
	Shakan.
Pacific American Fisheries	Excursion Inlet.
	Ketchikan.
	Port Walter.
Peril Straits Packing Co	Todd.
Petersburg Packing Co	Petersburg.
The Stuart Corporation (floating plant)	Ketchikan.
Central Alaska:	
Alaska Pacific Salmon Corporation	Drier Bay.
Alaska Packers Association	Kasilof.
Blue Island Packing Co	Blue Fox Bay.
Columbia River Packers Association	Chignik.
W. G. Culver	Point McManus.
Farwest Fisheries, Inc	Anchorage.
Gustan & Vogel	Point Possession.
Kadiak Fisheries Co	Shearwater Bay.
Katmai Packing Co	Uzinki.
Kenai River Packing Co	Kenai.
New England Fish Co	Cordova.
A. N. Nilson	Portlock.
North Coast Packing Co	Ninilchik.
Northwestern Fisheries Co	Chignik.
	Kenai.
	Orca.
	Uyak.
Pacific American Fisheries	Bering River.
	King Cove.
	Unakwik Inlet.
	Valdez.
Charles W. Pajoman	Iron Creek.
Pioneer Sea Foods Co	Eyak River.
Point Possession Fish Co	Point Possession.
Port Williams Packing Corporation	Port Williams.
Prince Packing Co	Drier Bay.
Redoubt Bay Packing Co	Redoubt Bay.
San Juan Fishing & Packing Co	Tutka Bay.
	Uganik Bay.
Shepard Point Packing Co	Port Ashton.
Harvey J. Smith	West Foreland.
Spur Fish Corporation	Nikishka Bay.

Central Alaska—Continued

Sunset Packing Co	Otter Creek.
Toman Packing Co	Anchorage.
Trinity Packing Co	Three Saints Bay.
John Wik	Kenai.
Jake Young	Port Chatham.

Western Alaska:

Alaska Packers Association	Naknek River.
	Nushagak Bay.
Columbia River Packers Association	Do.
Northwestern Fisheries Co	Naknek River.
	Nushagak Bay.
Red Salmon Canning Co	Naknek River.
	Ugashik River.

TOTAL CANNERIES OPERATED

There were 87 canneries operated in Alaska in 1932—31 in southeast, 34 in central, and 22 in western—which is 9 less in southeast, 17 less in central, and 3 less in the western district than in 1931, a net decrease of 29 plants. The Associated Fishermen of Alaska, Inc., operated the floating cannery *Santa Flavia* in both the central and western districts, but it is included in the total of western Alaska only.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1932

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Southeast Alaska:					
Alaska Pacific Salmon Corporation	2	Ketchikan	2		2
		Port Althorp		18	18
Annette Island Packing Co	1	Metlakatla	4		4
Astoria & Puget Sound Canning Co	1	Excursion Inlet		6	6
Bayview Packing Co	1	Klawak			
Beegle Packing Co	1	Ketchikan	1	2	3
Demmert Packing Co	1	Klawak			
Diamond K Packing Co	1	Wrangell (floating)		4	4
Ellson Packing Co	1	Douglas			
Fidalgo Island Packing Co	2	Bay of Pillars	4		4
		Ketchikan	2	4	6
Haines Packing Co	1	Letnikof Cove			
P. E. Harris & Co	1	Hawk Inlet		7	7
Hood Bay Canning Co	1	Hood Bay		4	4
Icy Straits Fisheries, Inc	1	Idaho Inlet (floating)			
Independent Salmon Canneries, Inc	1	Ketchikan			
Ketchikan Packing Co	1	do		4	4
Libby, McNeill & Libby	4	Craig		15	15
		George Inlet		4	4
		Kake	4	8	12
		Yakutat			
Nakat Packing Corporation, The	3	Hidden Inlet		6	6
		Union Bay		8	8
		Waterfall		10	10
O. Nicholson	1	Scow Bay	1	1	2
Northwestern Fisheries Co		Boca de Quadra [1]	1	2	3
		Hunter Bay [1]		2	2
		Kasaan [1]		2	2
Pyramid Packing Co., Inc	1	Sitka		4	4
Sebastian Stuart Fish Co	1	Tyee		7	7
Skowl Arm Packing Co	1	Skowl Arm		3	3
Superior Packing Co	1	Tenakee		5	5
Ward's Cove Packing Co	1	Ward Cove		3	3
Wrangell Packing Corporation	1	Wrangell			
Central Alaska:					
Alaska Pacific Salmon Corporation	1	Sand Point (floating)	2		2
Alaska Packers Association	3	Alitak	4		4
		Chignik	2		2
		Karluk	4		4
Alaska Year-Round Canneries Co	1	Seldovia	4		4

[1] Traps only were operated, the fish being packed at other canneries.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1932—Continued

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Central Alaska—Continued					
Alitak Fish Co	2	Alitak	4		4
		Zachar Bay			
Anderson Mercantile Co., Inc	1	Deep Creek			
Associated Fishermen of Alaska, Inc	1	False Pass			
Columbia River Packers Association		Chignik [1]	4		4
Cook Inlet Packing Co	1	Seldovia	6		6
Copper River Packing Co	1	McClure Bay		7	7
Harry W. Crosby	1	Chignik *			
H. J. Emard	1	Anchorage	2		2
Farwest Fisheries, Inc		do. [1]	2		2
Fidalgo Island Packing Co	1	Port Graham	7		7
Glacier Packing Co	1	Cordova (floating)			
Grimes Packing Co	1	Uzinki			
P. E. Harris & Co	1	False Pass	8		8
Kadiak Fisheries Co	1	Kodiak	5		5
Kenai River Packing Co		Kenai [1]	3		3
Libby, McNeill & Libby	1	do	13		13
Ninilchik Packing Co	1	Ninilchik	1		1
North Coast Packing Co		do. [1]	2		2
Northern Light Packing Co	1	Mountain Slough			
Northwestern Fisheries Co		Chignik [1]	2		2
		Kenai [1]	8		8
Pacific American Fisheries	1	Ikatan	7		7
Pioneer Packing Co	2	Cordova	2	1	3
		Kukak Bay			
Premier Salmon Co	1	Orca Inlet	2	1	3
Albert & Josie Sandvik	1	Uganik Village			
E. Sandvik	1	Swansons Creek			
San Juan Fishing & Packing Co	1	Evans Bay	2	3	5
		Uganik Bay [1]	1		1
Seward Fisheries, Inc	1	Seward			
Shelikof Packing Co	1	Zachar Bay			
Shumagin Packing Co	1	Squaw Harbor	2		2
Snug Harbor Packing Co	1	Snug Harbor	7		7
Standard Packing Co	1	Shepard Point		9	9
Strand-Jensen Fisheries Co	1	Cordova			
Uganik Fisheries, Inc	1	Uganik	3		3
Western Alaska:					
Alaska Packers Association	7	Egegik River			
		Kvichak Bay (2)			
		Naknek River (2)			
		Nushagak Bay			
		Ugashik River			
Alaska-Portland Packers Association	2	Naknek River			
		Nushagak Bay			
Alaska Salmon Co	1	Wood River			
Associated Fishermen of Alaska, Inc	1	Nushagak Bay (floating).			
Bristol Bay Packing Co	1	Kvichak Bay			
Herendeen Bay Consolidated Canneries	1	Herendeen Bay			
Libby, McNeill & Libby	6	Egegik River			
		Ekuk			
		Koggiung			
		Libbyville			
		Lockanok			
		Nushagak			
Nakat Packing Corporation, The	1	Nakeen			
Pacific American Fisheries	1	Port Moller	1		1
Red Salmon Canning Co	1	Naknek River			

[1] Traps only were operated, the fish being packed at other canneries.

LOSSES AND DISASTERS

Reported property losses in the Alaska fisheries in 1932 amounted to $223,978. The largest single item was the Taku Harbor cannery of Libby, McNeill & Libby, which was burned on May 9, the loss of buildings, fishing apparatus, and boats amounting to $144,400. The salmon and clam cannery of the West Coast Packing Co. at Polly Creek on the west shore of Cook Inlet was destroyed by fire in the latter part of May, before the salmon-canning season had begun.

The loss was $7,000. Other losses consisted chiefly of launches, scows, trap frames, and miscellaneous fishing gear.

In addition to the foregoing, the Lake Bay cannery of the Columbia River Packers Association, which has been idle since 1930, was considerably damaged by fire on June 20.

Thirteen lives were lost—3 in southeast Alaska, 5 in central, and 5 in western Alaska. In the southeastern district 1 fisherman and 1 shoresman were drowned and 1 fisherman met death by accident. One fisherman in central Alaska was drowned, 1 died of disease, and 1 was killed by accident; 1 shoresman died of disease and 1 committed suicide. In western Alaska 1 fisherman was drowned, 1 died of disease, and 1 by accident; 1 shoresman was drowned and 1 died of disease.

STATISTICS

In 1932, 87 canneries were operated in Alaska, 29 less than in 1931. Employment was given to 15,738 persons, as compared with 18,158 in 1931, a decrease of 2,420. White employees decreased 1,492; natives, 7; Japanese, 189; Filipinos, 746; and miscellaneous (Kanakas, Puerto Ricans, and Koreans), 32; while Chinese increased 13; Mexicans, 13; and Negroes, 20.

The total pack of canned salmon was 5,254,483 cases, valued at $21,715,801. This was a decrease of 149,256 cases, or about 3 percent, from the pack of 1931, and a decrease in value of $7,380,491, or 25 percent. The output in southeastern Alaska decreased from 2,538,936 to 2,208,053 cases, or 13 percent; and in central Alaska from 1,681,554 to 1,624,598 cases, or 3 percent; while in western Alaska there was an increase from 1,183,249 to 1,421,832 cases, or 20 percent. In Alaska as a whole the pack of reds increased from 1,694,278 to 2,103,081 cases, or 24 percent; kings increased from 51,867 to 69,526 cases, or 34 percent; and chums from 533,856 to 820,556 cases, or about 54 percent; while pinks decreased from 2,953,860 to 2,113,145 cases, or 28 percent; and cohos from 169,878 to 148,175 cases, or 13 percent.

Data are included in the following tables to show comparison of the 1932 pack with the average for the 5 preceding years, 1927 to 1931, by cases of each species and by districts. Three species—reds, chums, and kings—show a gain over the 5-year average, while cohos and pinks show a decline. By districts the packs in southeast and central Alaska each decreased 5 percent, while that in western Alaska increased 36 percent, making a net gain of 3 percent over the 5-year average.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1932

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	582	1,076	1,512	3,170
Natives	784	403	460	1,647
Japanese		1		1
Filipinos	5	1		6
Mexicans	3			3
Miscellaneous [1]		2		2
Total	1,374	1,483	1,972	4,829

[1] Kanakas, Puerto Ricans, etc.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1932—Continued

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED—continued				
Shoresmen:				
Whites	1,032	981	1,449	3,462
Natives	1,278	504	94	1,876
Chinese	128	180	369	677
Japanese	333	186	258	777
Filipinos	752	663	550	1,965
Mexicans	5	28	854	887
Negroes	1		51	52
Miscellaneous [1]	2	1	16	19
Total	3,531	2,543	3,641	9,715
Transporters:				
Whites	369	426	331	1,126
Natives	21	41		62
Chinese			5	5
Japanese		1		1
Total	390	468	336	1,194
Total:				
Whites	1,983	2,483	3,292	7,758
Natives	2,083	948	554	3,585
Chinese	128	180	374	682
Japanese	333	188	258	779
Filipinos	757	664	550	1,971
Mexicans	8	28	854	890
Negroes	1		51	52
Miscellaneous [1]	2	3	16	21
Grand total	5,295	4,494	5,949	15,738
Wages paid shoresmen	$964,961	$974,409	$1,345,627	$3,284,997
Wages paid transporters	$175,526	$193,716	$130,274	$499,516
OPERATING UNITS				
Plants:				
Shore canneries	29	32	21	82
Floating canneries:				
Power vessels	1	1	1	3
Net tonnage	56	1,760	1,424	3,240
Barges	1	1		2
Net tonnage	488	389		877
Total plants operated	31	34	22	87
Vessels:				
Power, over 5 tons	208	136	80	424
Net tonnage	3,874	5,201	24,043	33,118
Launches	72	274	27	373
Power dories	17	21	3	41
Gill-net boats	25	61	1,001	1,087
Seine skiffs	41	140	3	184
Other rowboats and skiffs	496	649	162	1,307
Lighters and scows	145	190	117	452
Houseboats	12	4	29	45
Pile drivers	18	25	14	57
Pile pullers	2	3		5
Rigging scows	19	6		25
Apparatus:				
Purse seines	189	48	3	240
Fathoms	34,055	4,900	675	39,630
Beach seines	4	78	1	83
Fathoms	400	10,160	100	10,660
Gill nets	157	1,494	[2] 1,282	2,933
Fathoms	12,075	62,925	112,750	187,750
Traps, driven	22	127	1	150
Traps, floating	171	22		193

[1] Kanakas, Puerto Ricans, etc.
[2] Includes 268 stake nets of an average length of 25 fathoms each, used in the Bristol Bay area.

Output and value of canned salmon in Alaska in 1932 [1]

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Coho, or silver:								
½-pound flat	3,423	$21,540	19	$123			3,442	$21,663
1-pound flat	1,763	8,815					1,763	8,815
1-pound tall	81,852	334,789	60,655	244,066	463	$1,882	142,970	580,737
Total	87,038	365,144	60,674	244,189	463	1,882	148,175	611,215
Chum, or keta:								
½-pound flat	624	2,496					624	2,496
1-pound tall	578,819	1,609,799	147,410	408,523	93,703	267,629	819,932	2,285,951
Total	579,443	1,612,295	147,410	408,523	93,703	267,629	820,556	2,288,447
Pink, or humpback:								
½-pound flat	6,747	31,787	419	1,878			7,166	33,665
1-pound tall	1,372,259	4,331,866	723,632	2,238,803	10,088	32,628	2,105,979	6,603,297
Total	1,379,006	4,363,653	724,051	2,240,681	10,088	32,628	2,113,145	6,636,962
King, or spring:								
½-pound flat	509	4,684	9,745	73,647	1,459	11,672	11,713	90,003
1-pound flat	4,691	27,423	8,121	61,060	1,988	13,062	14,800	101,545
1-pound tall	18,424	81,800	14,436	62,029	10,153	43,931	43,013	187,760
Total	23,624	113,907	32,302	196,736	13,600	68,665	69,526	379,308
Red, or sockeye:								
½-pound flat	14,278	110,802	33,406	278,254	23	184	47,707	389,240
1-pound flat	13,421	91,263	54,495	353,140	7,608	47,943	75,524	492,346
1-pound tall	111,243	593,185	572,260	3,039,034	1,296,347	7,286,064	1,979,850	10,918,283
Total	138,942	795,250	660,161	3,670,428	1,303,978	7,334,191	2,103,081	11,799,869
Grand total	2,208,053	7,250,249	1,624,598	6,760,557	1,421,832	7,704,995	5,254,483	21,715,801

[1] Cases containing ½-pound cans have been reduced one half in number, and thus, for the purpose of affording fair comparison, all are put upon the basis of forty-eight 1-pound cans to the case.

Output of canned salmon in Alaska, in cases, 1927 to 1932 [1]

BY SPECIES

Product	1927	1928	1929	1930	1931	Average for 5-year period, 1927-31	1932	Percentage of increase or decrease in 1932, as compared with 5-year average
Coho, or silver:								
¼-pound flat				371		74		−100.00
½-pound flat	10,105	13,498	7,880	18,808	9,962	12,051	3,442	−71.44
1-pound flat	15,047	5,840	6,730	5,926	2,902	7,289	1,763	−75.81
1-pound tall	227,892	279,285	157,346	307,317	157,014	225,771	142,970	−36.67
Total	253,044	298,623	171,956	332,422	169,878	245,185	148,175	−39.57
Chum, or keta:								
½-pound flat	9,414	5,057	4,961	8,384	4,242	6,412	624	−90.27
1-pound flat	1,449	4			35	297		−100.00
1-pound tall	496,860	990,724	859,551	591,550	529,579	693,653	819,932	+18.20
Total	507,723	995,785	864,512	599,934	533,856	700,362	820,556	+17.16

[1] The number of cases shown has been put upon the common basis of forty-eight 1-pound cans per case.

Output of canned salmon in Alaska, in cases, 1927 to 1932—Continued

BY SPECIES—Continued

Product	1927	1928	1929	1930	1931	Average for 5-year period, 1927–31	1932	Percentage of increase or decrease in 1932, as compared with 5-year average
Pink, or humpback:								
¼-pound flat				1,113		222		−100.00
½-pound flat	50,455	40,473	44,762	81,064	46,524	52,656	7,166	−86.39
1-pound flat	14,662	6,189	3,910	4,867	4,410	6,808		−100.00
1-pound tall	1,355,658	2,740,580	2,522,985	3,101,490	2,902,926	2,524,728	2,105,979	−16.59
Total	1,420,775	2,787,242	2,571,657	3,188,534	2,953,860	2,584,414	2,113,145	−18.24
King, or spring:								
½-pound flat	10,528	11,782	16,320	17,840	13,208	13,936	11,713	−15.95
1-pound flat	11,371	14,854	26,808	23,686	16,721	18,688	14,800	−20.80
1-pound tall	48,492	27,523	28,979	18,396	21,938	29,065	43,013	+47.99
Total	70,391	54,159	72,107	59,922	51,867	61,689	69,526	+12.70
Red, or sockeye:								
¼-pound flat				370		74		−100.00
½-pound flat	88,874	89,063	100,136	110,605	58,178	89,371	47,707	−46.62
1-pound flat	57,771	87,100	75,326	62,972	41,002	64,834	75,524	+16.49
1-pound tall	1,173,550	1,771,931	1,514,465	677,567	1,595,098	1,346,522	1,979,850	+47.03
Total	1,320,195	1,948,094	1,689,927	851,514	1,694,278	1,500,801	2,103,081	+40.13
Grand total	3,572,128	6,083,903	5,370,159	5,032,326	5,403,739	5,092,451	5,254,483	+3.18

BY DISTRICTS AND SPECIES

Southeast Alaska:								
Coho, or silver	114,970	145,770	97,847	155,652	88,455	120,539	87,038	−27.79
Chum, or keta	224,433	570,219	290,797	283,478	274,248	328,635	579,443	+76.32
Pink, or humpback	588,291	2,142,838	1,542,615	2,309,976	2,013,442	1,719,432	1,379,006	−19.80
King, or spring	8,031	5,522	7,000	6,939	14,896	8,478	23,624	+178.65
Red, or sockeye	116,468	106,798	162,952	221,241	147,895	151,071	138,942	−8.03
Total	1,052,193	2,971,147	2,101,211	2,977,286	2,538,936	2,328,155	2,208,053	−5.16
Central Alaska:								
Coho, or silver	138,034	152,360	71,330	173,352	81,331	123,281	60,674	−50.78
Chum, or keta	253,197	377,857	497,774	284,751	193,053	321,327	147,410	−54.12
Pink, or humpback	817,538	643,330	1,025,652	859,761	940,418	857,340	724,051	−15.55
King, or spring	43,470	35,036	35,661	32,060	27,599	34,765	32,302	−7.08
Red, or sockeye	318,864	430,572	454,086	268,621	439,153	382,259	660,161	+72.70
Total	1,571,103	1,639,155	2,084,503	1,618,545	1,681,554	1,718,972	1,624,598	−5.49
Western Alaska:								
Coho, or silver	40	493	2,779	3,418	92	1,364	463	−66.06
Chum, or keta	30,093	47,709	75,941	31,705	66,555	50,401	93,703	+85.91
Pink, or humpback	14,946	1,074	3,390	18,797		7,641	10,088	+32.02
King, or spring	18,890	13,601	29,446	20,923	9,372	18,446	13,600	−26.27
Red, or sockeye	884,863	1,410,724	1,072,889	361,652	1,107,230	967,472	1,303,978	+34.78
Total	948,832	1,473,601	1,184,445	436,495	1,183,249	1,045,324	1,421,832	+36.02
Grand total	3,572,128	6,083,903	5,370,159	5,032,326	5,403,739	5,092,451	5,254,483	+3.18

Relative importance of each species of canned salmon within each district in 1932

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Southeast Alaska	3.9	26.2	62.5	1.1	6.3	100.0
Central Alaska	3.7	9.1	44.6	2.0	40.6	100.0
Western Alaska		6.6	.7	1.0	91.7	100.0
All Alaska	2.8	15.6	40.2	1.3	40.1	100.0

Relative importance of each district in the production of each species of salmon canned in 1932

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percen*
Southeast Alaska	58.7	70.6	65.2	34.0	6.6	42.0
Central Alaska	41.0	18.0	34.3	46.4	31.4	30.9
Western Alaska	.3	11.4	.5	19.6	62.0	27.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Average annual price per case of forty-eight 1-pound cans of salmon, 1922 to 1932

Product	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
Coho, or silver	$5.47	$5.74	$6.83	$9.72	$8.40	$8.51	$7.12	$7.59	$8.26	$6.51	$4.12
Chum, or keta	3.98	4.65	4.68	4.44	5.01	5.47	6.06	5.35	3.60	3.19	2.79
Pink, or humpback	4.34	4.86	4.93	5.28	5.39	5.87	6.56	6.06	4.17	3.46	3.14
King, or spring	8.08	8.56	8.89	11.91	10.37	11.25	11.13	11.92	13.32	9.40	5.46
Red, or sockeye	9.24	9.27	9.53	13.12	9.89	12.08	9.41	10.71	12.57	9.20	5.61

PACK IN CERTAIN DISTRICTS

Statistics of the salmon pack are again presented for subdivisions of the three main districts of Alaska, and comparison is made with similar statistics for 1931. Where the pack at a given cannery is made up of fish from more than one district, as in the case of that at certain Cordova canneries which pack fish caught both in Prince William Sound and in the Copper River area or at various plants in southeastern Alaska which draw for their supply on the catch of more than one district, due segregation has been made in order to credit each district with the pack from salmon caught therein. These districts are described as follows:

WESTERN ALASKA

Bristol Bay.—The Bering Sea shore, east and north of the Ugashik River.

Port Moller and Herendeen Bay.—Port Moller, Herendeen Bay, and Nelson Lagoon.

CENTRAL ALASKA

Ikatan-Shumagin Islands.—False Pass, Ikatan Bay, King Cove, and the Shumagin Islands.

Chignik.—Canneries located at Chignik.

Kodiak-Afognak Islands.—Kodiak, Spruce, and Raspberry Islands.

Cook Inlet.—The shores of Cook Inlet.
Prince William Sound.—Extends from Resurrection Bay to Point Whitshed.
Copper and Bering Rivers.—Extends from Point Whitshed to Bering River.

SOUTHEASTERN ALASKA

Yakutat and Dry Bay.—Extends from Yakutat Bay to and including Dry Bay.
Icy Strait-Lynn Canal.—West coast of Baranof and Chichagof Islands, the shores of Cross Sound. Icy Strait, Lynn Canal, and Stephens Passage, south to Taku Harbor.
Chatham Strait-Frederick Sound.—Both shores of Chatham Strait and its bays from Point Augusta to Cape Ommaney, and through Frederick Sound and its bays northward to Taku Harbor, including Kake.
Sumner Strait-Dixon Entrance.—Extends southward from Petersburg and eastward from Port Beauclerc to Cape Chacon and Dixon Entrance, and includes all canneries on the mainland and intervening islands from the Stikine River to Portland Canal.
West coast, Prince of Wales Island.—Territory west and south of a line from Cape Chacon to Point Baker and Cape Ommaney.

Pack of canned salmon in Alaska in 1932, by districts [1]

District	Coho	Chum	Pink	King	Red	Total	Percentage of increase or decrease from 1931
	Cases	*Cases*	*Cases*	*Cases*	*Cases*	*Cases*	
Bristol Bay	463	88, 206	10, 088	12, 778	1, 225, 618	1, 337, 153	+19. 43
Port Moller and Herendeen Bay		5, 497		822	78, 360	84, 679	+33. 11
Ikatan-Shumagin Islands	9, 774	79, 732	194, 537	4, 398	238, 758	527, 199	+59. 53
Chignik	2, 898	4, 917	43, 839	142	153, 111	204, 907	+135. 19
Kodiak-Afognak Islands	4, 541	23, 135	254, 760	473	84, 908	367, 817	−36. 28
Cook Inlet	32, 635	6, 317	23, 806	17, 912	87, 932	168, 602	+21. 88
Prince William Sound	10, 826	33, 309	207, 109	1, 370	26, 659	279, 273	−40. 01
Copper and Bering Rivers				8, 007	68, 793	76, 800	−7. 27
Yakutat and Dry Bay	17, 870	362	7, 717	4, 909	21, 175	52, 033	−22. 10
Icy Strait-Lynn Canal	22, 085	182, 765	238, 281	5, 829	54, 540	503, 500	−15. 86
Chatham Strait-Frederick Sound	16, 773	114, 336	231, 184	1, 037	10, 562	373, 892	−37. 73
Sumner Strait-Dixon Entrance	21, 197	170, 540	709, 494	295	36, 166	937, 692	+9. 97
West coast, Prince of Wales Island	9, 113	111, 440	192, 330	11, 554	16, 499	340, 936	−18. 95
Total	148, 175	820, 556	2, 113, 145	69, 526	2, 103, 081	5, 254, 483	−2. 76

[1] Pack reduced to the basis of forty-eight 1-pound cans per case.

MILD CURING

The production of mild-cured salmon in Alaska in 1932 was considerably larger than in the preceding year despite the continued downward trend of prices. King and coho salmon were abundant on all major fishing grounds, and mild-curing operations were carried on throughout the season without any loss of time by strikes among the fishermen. Eighteen plants in southeast Alaska and two in the western district were engaged in the industry. The reports of these companies, together with the census of the trolling fleet by the Bureau, show a total of 1,221 persons employed.

The total output of mild-cured salmon was 4,434,400 pounds, valued at $461,504, an increase of 1,113,600 pounds in quantity, but a decrease of $172,249 in value, as compared with the production of 1931.

Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1932

Item	Southeast Alaska	Western Alaska	Total
PERSONS ENGAGED			
Fishermen:			
Whites	664	3	667
Natives	360	9	369
Chinese	2		2
Filipinos	7		7
Mexicans	3		3
Total	1,036	12	1,048
Shoresmen:			
Whites	124	3	127
Natives	6	10	16
Filipinos	2		2
Mexican	1		1
Total	133	13	146
Transporters:			
Whites	17		17
Natives		10	10
Total	17	10	27
Grand total	1,186	35	1,221
Wages paid shoresmen	$98,005	$1,323	$99,328
Wages paid transporters	$8,186	$1,177	$9,363

Item	Southeast Alaska	Western Alaska	Total
OPERATING UNITS			
Plants:			
Shore	15	2	17
Floating:			
Barges	3		3
Net tonnage	720		720
Total plants operated	18	2	20
Vessels:			
Power, over 5 tons	152		152
Net tonnage	1,218		1,218
Launches	589	1	590
Gill-net boats		11	11
Rowboats and skiffs	158		158
Lighters and scows	3		3
Houseboats	2		2
Apparatus:			
Gill nets		13	13
Fathoms		620	620
Lines	3,047		3,047

Products of Alaska salmon mild-curing industry in 1932

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	[1] 249,600	$9,422	[2] 17,600	$660			[3] 267,200	$10,082
King, or spring	[4] 3,992,000	436,613			[5] 175,200	$14,809	[6] 4,167,200	451,422
Total	4,241,600	446,035	17,600	660	175,200	14,809	4,434,400	461,504

[1] 312 tierces.
[2] 22 tierces.
[3] 334 tierces.
[4] 4,990 tierces.
[5] 219 tierces.
[6] 5,209 tierces.

PICKLING

A sharp decline in the output of pickled salmon in Alaska in 1932 may be attributed to the fact that large stocks were carried over from the preceding year and that low prices prevailed throughout the season. Of the commercial producion, somewhat more than one half came from the western district, where a number of the canneries put up salt salmon in addition to their canned product. Two operators—F. Kruse on the *Dorothea*, which was used chiefly in the herring fishery, and F. D. Harris on the *Lottie Bennett*—engaged in the pickling of salmon at the mouth of the Kuskokwim River, where the total output amounted to 175 barrels, chiefly of chums and red salmon.

Eighty-nine persons were engaged in the industry, a decrease of 54 from the number employed in 1931. The total output was 305.410 pounds, valued at $20,629, as compared with 1,141,200 pounds, valued at $103,508, in 1931—a decrease of about 73 percent in quantity and 80 percent in value.

Persons engaged, wages paid, and operating units, Alaska salmon-pickling industry, 1932

Items	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	3	13	14	30
Natives		5	10	15
Total	3	18	24	45
Shoresmen:				
Whites	1		2	3
Natives			18	18
Total	1		20	21
Transporters:				
Whites			22	22
Japanese			1	1
Total			23	23
Grand total	4	18	67	89
Wages paid shoresmen			$3,250	$3,250
OPERATING UNITS				
Plants:				
Shore	2	11	4	17
Floating:				
Sailing vessel			1	1
Net tonnage			496	496
Total plants operated	2	11	5	18
Vessels:				
Power, over 5 tons	1	1	2	4
Net tonnage	8	6	62	76
Launches		3	3	6
Power dories		5	1	6
Gill-net boats		1	5	6
Seine skiffs		5		5
Rowboats	1	3	3	7
Lighters and scows		1	1	2
Apparatus:				
Purse seines		2		2
Fathoms		165		165
Beach seines		6		6
Fathoms		295		295
Gill nets	1	5	33	39
Fathoms	50	180	1,120	1,350
Wheels			2	2

Products of Alaska salmon-pickling industry in 1932

Species	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	13,200	$700	1,825	$214	800	$32	15,825	$946
Chum, or keta					17,585	678	17,585	678
Pink, or humpback					1,800	72	1,800	72
King, or spring			1,650	224	24,750	2,323	26,400	2,547
Red, or sockeye	3,000	240	113,800	7,471	127,000	8,675	243,800	16,386
Total	16,200	940	117,275	7,909	171,935	11,780	305,410	20,629

FRESH SALMON

The fresh-salmon business was largely incidental to the mild curing of salmon and was carried on only in southeast Alaska. Two dealers, whose chief product was fresh salmon, gave employment to 6 white shoresmen. The output consisted of 1,091,359 pounds of kings valued at $70,415 and 4,554 pounds of cohos valued at $159, a total of 1,095,913 pounds valued at $70,574, against 768,619 pounds valued at $55,918 in 1931—an increase of approximately 43 percent in quantity and 26 percent in value.

The foregoing figures do not include the fresh salmon sold to halibut boats for bait, which is shown under miscellaneous salmon products.

FREEZING

The production of frozen salmon was incidental to other fishery activities in southeast Alaska, where 6 cold-storage plants are located. Two companies whose chief output was frozen salmon gave employment to 20 white shoresmen. No production of salmon fillets was reported this season. The total output of frozen salmon in 1932 was 6,116,921 pounds valued at $226,204, as compared with 6,182,917 pounds valued at $411,815 in 1931.

Products of the frozen-salmon industry in 1932

Species	Pounds	Value	Species	Pounds	Value
Coho, or silver	3,883,223	$131,000	Red, or sockeye	400	
Chum, or keta	247,909	5,300			
Pink, or humpback	54,670	547	Total	6,116,921	226,204
King, or spring	1,930,719	89,345			

DRIED, SMOKED, AND OTHER MISCELLANEOUS SALMON PRODUCTS

A few cases of smoked salmon packed in oil were prepared in southeast and central Alaska, and small quantities of kippered and dried salmon were reported also from the latter district, all of which production was incidental to other fishery operations. The sale of salmon to halibut boats for bait was reported by a number of operators, chiefly in southeast Alaska. In the fishery of the Yukon, Tanana, and Kuskokwim Rivers, which is carried on principally by natives, 2,390,000 pounds of chum salmon were dried, valued at $96,258, and 2,064 pounds of canned smoked salmon were prepared, valued at $430. In this western district 11 whites and 670 natives engaged in the fishery, and the apparatus used consisted of 281 wheels, 578 gill nets of 8,276 fathoms, and 50 rowboats and skiffs.

Production of dried, smoked, and other miscellaneous salmon products in Alaska in 1932

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Dried:								
Coho, or silver			250	$13			250	$13
Chum, or keta			225	10	2,390,000	$96,258	2,390,225	96,268
Pink, or humpback			95	2			95	2
Total			570	25	2,390,000	96,258	2,390,570	96,283
Kippered: King, or spring			200	60			200	60
Smoked and packed in oil:								
King, or spring	1,440	$288	1,536	640	2,064	430	5,040	1,358
Fresh, for bait:								
Chum, or keta	76,400	170					76,400	170
Pink, or humpback	32,500	160	7,600	38			40,100	198
Total	108,900	330	7,600	38			116,500	368
Frozen, for bait:								
Pink, or humpback	50,000	200					50,000	200
Grand total	160,340	818	9,906	763	2,392,064	96,688	2,562,310	98,269

BYPRODUCTS

One plant in southeast Alaska prepared salmon byproducts, giving employment to 12 white shoresmen, and two salmon canneries in central Alaska manufactured salmon oil and fertilizer as an adjunct to their canning operations. The total production was 847,285 pounds of fertilizer, valued at $11,060, and 39,821 gallons of oil, valued at $5,770; as compared with 1,585,288 pounds of fertilizer, valued at $29,094, and 54,980 gallons of oil, valued at $12,312, in 1931—a decrease of about 47 percent in the amount of fertilizer and 28 percent in the quantity of oil.

HERRING

An outstanding feature of the herring fishery of Alaska in 1932 was the abundance of fish in the Kodiak area, which yielded by far the largest output of Scotch-cured herring of any Alaska district. The Prince William Sound area likewise increased its production over the preceding year, showing a substantial gain in the output both of pickled herring and of meal and oil, although but two plants were in operation during the season. In southeast Alaska the output was somewhat larger than in 1931, but there was a sharp decrease in western Alaska, where the herring were less plentiful and of smaller size than in former years. The herring industry, like other branches of the fisheries, was affected by the prevailing low prices, and notwithstanding the gain in volume of production, the total value of the products was considerably lower than in 1931.

The floating plant *Donna Lane*, formerly owned by the Utopian Fisheries, Inc., and the *Rosamond*, which had belonged to the North American Fisheries, were operated in the Kodiak-Afognak district by new companies, the Oceanic Fisheries, Inc., and San Marco Fish

Co., respectively. A number of small floating plants also were operated in various localities.

In southeast Alaska 18 concerns handled herring in 1932, a decrease of 2 from the number engaged in the previous year. Of these, 4 were cold-storage plants handling frozen herring for bait and 8 operated pounds to provide fresh bait herring to the halibut fleet. Five concerns engaged in the saltery and reduction business, as follows:

Arentsen & Co	Big Port Walter.
Buchan & Heinen Packing Co	Port Armstrong.
Northwestern Herring Co	Port Conclusion.
Port Walter Herring & Packing Co	Saginaw Bay.
Storfold & Grondahl Packing Co	Washington Bay.

Thirteen concerns engaged in the herring fishery in central Alaska in 1932. The operations of 1 company were incidental to clam canning, 1 firm handled only herring for bait, 2 produced pickled herring and by-products, and 9 engaged only in saltery operations. The more important operators in the district were as follows:

Salteries:	
Apex Fish Co	Kodiak.
David Buvick	Shuyak Strait.
Johnson Fisheries Co	Port Williams.
Kodiak Herring Co. (floating plant)	Kodiak-Afognak district.
Ness Fish Co. (floating plant)	Malina Bay.
Oceanic Fisheries, Inc. (floating plant)	Kodiak-Afognak district.
Charles W. Pajoman	Raspberry Island.
San Marco Fish Co. (floating plant)	Amee Bay.
Charles L. E. Svendsen	Shuyak Island.
Saltery and reduction plants:	
Chatham Strait Fish Co	Crab Bay.
Port Benny Packing Co	Evans Bay.

The chief operators in the western district were the following, all of whom prepared Scotch-cured herring:

Austnes & Rod	Unalaska.
Campbell & Dougal	Dutch Harbor.
Jordan Columbus	Do.
Andrew Conrad	Golovin Bay.
Golovin Bay Packing Co	Do.
Ed Jacobsen & Co	Dutch Harbor.
F. Kruse (floating plant)	Do.
Northwestern Herring Co	Akutan.
Olaf Olsen	Dutch Harbor.

Biological studies of the Alaska herring were continued by Dr. George A. Rounsefell and two assistants in southeast Alaska.

STATISTICAL SUMMARY

Eight hundred and nineteen persons engaged in the Alaska herring industry in 1932, as compared with 730 in 1931. The number of plants decreased from 29 to 27. Products of the fishery were valued at $1,173,158, a decrease of $54,738, or approximately 4 percent, from 1931, when the total value was $1,227,896. Scotch-cured herring increased from 8,011,050 pounds in 1931 to 12,793,225, or about 60 percent. Herring for bait decreased from 7,607,797 pounds to 6,486,815 pounds, or about 15 percent; meal increased about 21

percent in quantity, but decreased approximately 16 percent in value; and oil increased about 16 percent in quantity but decreased 32 percent in value.

Persons engaged, wages paid, and operating units, Alaska herring industry, 1932

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	202	109	32	343
Natives	6	18	20	44
Total	208	127	52	387
Shoresmen:				
Whites	154	173	20	347
Natives		16	61	77
Total	154	189	81	424
Transporters: Whites		2	6	8
Grand total	362	318	139	819
Wages paid shoresmen	$63,882	$63,401	$11,216	$138,499
Wages paid transporters		$1,000	$2,717	$3,717
OPERATING UNITS				
Plants:				
Shore	5	7	10	22
Floating—				
Power vessels		3	1	4
Net tonnage		1,556	65	1,621
Sailing vessel		1		1
Net tonnage		985		985
Total plants operated	5	11	11	27
Vessels:				
Power, over 5 tons	34	21	2	57
Net tonnage	997	485	36	1,518
Launches	2	1	6	9
Power dories			2	2
Gill-net boats			8	8
Seine skiffs	24	10	1	35
Other rowboats and skiffs	19	10	19	48
Lighters and scows	2			2
Pile drivers	1	1		2
Apparatus:				
Purse seines	34	16		50
Fathoms	5,432	2,552		7,984
Gill nets			88	88
Fathoms			2,480	2,480
Pound seines	15	11		26
Pounds	3	17		20

Products of Alaska herring industry in 1932

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fresh, for bait	2,806,210	$25,490	993,000	$7,956			3,799,210	$33,446
Frozen, for bait	2,687,605	14,496					2,687,605	14,496
Pickled, for food: Scotch cure	2,680,825	127,698	8,342,150	400,532	1,770,250	$90,650	12,793,225	618,880
Roused for food (bloater stock)					422,900	14,520	422,900	14,520
Spiced	1,200	200					1,200	200
Dry salted					145,470	5,091	145,470	5,091
Meal	15,298,179	183,898	3,920,300	46,008			19,218,479	229,906
Oil	[1] 15,432,713	211,818	[2] 3,360,105	44,801			[3] 18,792,818	256,619
Total	38,906,732	563,600	16,615,555	499,297	2,338,620	110,261	57,860,907	1,173,158

[1] 2,057,695 gallons. [2] 448,014 gallons. [3] 2,505,709 gallons.

HALIBUT

Anticipating continued unsettled market conditions, members of the Fishing Vessel Owners Association at the beginning of the 1932 season adopted a system of voluntary curtailment of fishing effort in an attempt to stabilize prices at levels that would permit the operation of their vessels at a reasonable profit and at the same time prevent the building up early in the year of large stocks of frozen halibut to become a detriment to the fresh-halibut market as the season advanced. The restrictive measures were stringent, calling for a number of lay-off periods aggregating about 2 months for each vessel in the association. As these measures were well supported, their object would probably have been attained but for the unforeseen abundance of halibut on the fishing grounds. Notwithstanding the curtailed operations, the catches were larger than in 1931 and the prices were the lowest recorded for many years. The amount landed at Alaska ports, however, showed a sharp decline, as the bulk of the catch was transported direct to Seattle from the fishing banks.

Halibut livers became an important source of revenue to the fishermen in 1932, in some instances providing the only profit gained on a fishing trip. Several large pharmaceutical concerns purchased the livers through halibut buyers in Alaska and Pacific coast ports.

The International Fisheries Commission, under the direction of Dr. William F. Thompson, continued the life-history studies of the Pacific halibut. The Canadian vessel *Zapora* was chartered by the commission to transport its staff of scientific investigators to points along the British Columbia and Alaska coasts, where collections of halibut eggs and larvæ were made and investigations of the general trend of the fishery were carried on. Important regulations were promulgated by the commission, effective February 13, 1932, dividing the waters into four areas, limiting the catch in specified areas, and requiring that all registered vessels engaged in halibut fishing should be licensed by the commission and should make statistical report thereto.

In the Alaska fishery statistics are included only the output and operating units of the Alaska fleet, which comprises all American vessels landing more than one half of their catch in Alaska or British Columbia ports rather than in the States. There were 459 persons engaged in the industry in 1932, as compared with 946 in the preceding year, and the products totaled 13,552,296 pounds, valued at $493,052. Landings of halibut in Alaska totaled 4,562,988 pounds, valued at $134,652. In 1931 the landings of the Alaska fleet were 20,425,633 pounds, valued at $1,352,687, while landings in Alaska totaled 9,626,118 pounds, valued at $608,480. Thus the decrease in fares of the Alaska fleet was 6,873,337 pounds, or approximately 34 percent in quantity and 64 percent in value, while landings at Alaska ports decreased 5,063,130 pounds, or about 53 percent in quantity and 78 percent in value from the preceding year.

These statistics are compiled from data collected by the International Fisheries Commission and by Bureau agents. The amount of halibut livers landed by the Alaska fleet was not reported, but it was stated that there were altogether about 500,000 pounds of halibut livers, valued at about $60,000, landed at Alaska and Pacific coast ports during 1932 by American vessels.

Persons engaged, wages paid, and operating units, Alaska halibut industry, 1932

Items	Total	Items	Total
PERSONS ENGAGED		OPERATING UNITS	
Fishermen: Whites	452	Vessels:	
Shoresmen: Whites	7	Power, over 5 tons	78
Total	459	Net tonnage	1,490
Wages paid shoresmen	$1,432	Launches	19
		Dories	78
		Skates of lines	2,318

Products of the Alaska halibut fishery in 1932

Products	Southeast Alaska		Central Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Fresh (including local)	11,478,568	$427,181	13,933	$945	11,492,501	$428,126
Frozen	2,051,795	64,366	8,000	560	2,059,795	64,926
Total	13,530,363	491,547	21,933	1,505	13,552,296	493,052

COD

Cod-fishing operations from shore stations in Alaska have been comparatively unimportant for several years and in 1932 they were still further curtailed. Only 24 persons (15 whites and 9 natives) were reported engaged in the industry, a decrease of 23 from the number employed in 1931. About one half of these operators were in the Shumagin Islands region, a few were located at Squaw Harbor and Unalaska, and the remainder belonged to a native community enterprise at Nikolski. Products of the fishery were as follows: 146,345 pounds of dry-salted cod, valued at $3,471; 31,018 pounds of pickled cod, valued at $924; 19,600 pounds of stockfish, valued at $1,143; and 300 pounds of tongues, valued at $45—a total of 197,263 pounds, valued at $5,583, as compared with 414,898 pounds, valued at $23,650 in 1931.

In addition to the foregoing, cod fishing was carried on as heretofore in Bering Sea by an offshore fleet, the products of which are not included with the Alaska fisheries output because the vessels operate from and land their fares in ports of the Pacific Coast States. The *Wawona* (413 tons) was again used by the Robinson Fisheries Co., the *Sophie Christenson* (570 tons) was operated in place of the *C. A. Thayer* that had been used in 1931 by the Pacific Coast Codfish Co., and the *Louise* (328 tons), *Beulah* (339 tons), and *William H. Smith* (496 tons) were operated by the Union Fish Co. The halibut vessels *Dorothy* and *Helgeland* also were engaged in the cod fishery for part of the season. Products of the offshore fishery were 3,639,255 pounds of dry-salted cod, valued at $127,362, and 6,400 pounds of tongues, valued at $96, a total of 3,645,655 pounds, valued at $127,458, as compared with 3,352,011 pounds, valued at $220,129 in 1931. The offshore fishery employed 135 persons, or 12 less than in the previous year.

WHALES

Only one whaling station—that of the American Pacific Whaling Co. at Port Hobron—was operated in Alaska in 1932. Four steam whalers were used, and employment was given to 107 whites and 7 natives. Two hundred and seventy whales were taken, of which 60 were finbacks, 128 humpbacks, 78 sulphur bottoms, 2 sperm, and 2 right whales.

The products of the whale fishery were 736,011 gallons of whale oil, valued at $76,379; 7,208 gallons of sperm oil, valued at $884; 722 tons of fertilizer from meat, valued at $9,025; and 323 tons of bone fertilizer, valued at $4,845, a total value of products of $91,133.

CLAMS

In 1932, as in the previous year, the clam industry was less affected by falling commodity prices than were other branches of the Alaska fisheries, and the pack of clams increased considerably. Several new operators entered the field, the most important of which were the Strand-Jensen Fisheries Co., of Cordova, and the North Pacific Packing Co., Inc., of Seldovia. Although some packing was done at Aniakchak and on Cook Inlet, where operations had not been carried on for a number of years, and although there was a good production from the Kodiak district, particularly from the mainland shores from Kukak Bay to Snug Harbor, the bulk of the output came from the long-established beaches in the vicinity of Cordova. In the last-named region digging was so intensive that it became necessary to close the season June 25, instead of July 15, in order to prevent depletion.

Employment was given to 697 persons, of whom 572 were whites, 109 natives, 12 Japanese, and 4 Filipinos. The output consisted of 71,395 cases, containing 1,756,776 pounds (1,754,472 pounds of razor clams and 2,304 pounds of butter clams), and 100 dozen clams in the shell, with a total value of $447,368. Of the canned product, 1,185,042 pounds were from the vicinity of Cordova, 316,770 pounds from the Kodiak district, 241,536 pounds from Cook Inlet, 12,948 pounds from Aniakchak, and 480 pounds from southeast Alaska. The total output shows an increase of about 59 percent in quantity and 43 percent in value above that for 1931, when clam products amounted to 1,108,002 pounds, valued at $312,457.

Products of the Alaska clam industry in 1932

Item	Cases	Pounds	Value
Minced:			
4-ounce cans (48 to case)	100	1,200	$780
½-pound cans (48 to case)	66,929	1,606,296	412,392
10-ounce cans (48 to case)	3,066	91,980	22,382
12-ounce cans (48 to case)	137	4,932	1,096
1-pound cans (48 to case)	152	7,296	1,064
Whole:			
½-pound cans (48 to case)	144	3,456	1,433
1-pound cans (48 to case)	867	41,616	8,171
Total	71,395	1,756,776	447,318
Fresh, in shell, 100 dozen		240	50
Grand total		1,757,016	447,368

SHRIMP

One new concern—the Stikine Sea Food Co., at Wrangell—in addition to the two that operated during the previous year, engaged in the shrimp industry in southeastern Alaska in 1932. The Northern Sea Food Co. again produced a small quantity of shrimp meat at Cordova, in central Alaska, where operations are still in the experimental stage.

The number of persons employed in the industry was 133, of whom 24 were whites, 76 natives, 1 Chinese, 18 Japanese, 10 Filipinos, and 4 Mexicans. Products consisted of 299,436 pounds of shrimp meat, valued at $113,903, and 2,350 pounds of fresh shrimp in shell, valued at $233, a total of 301,786 pounds, valued at $114,136. Comparable figures for 1931 show a production of 460,050 pounds, valued at $184,447.

CRABS

In southeastern Alaska crab products were prepared by the Northern Sea Food Co. at Petersburg, by the Stikine Sea Food Co., which was engaged primarily in the shrimp industry, at Wrangell, and by O. H. Wood at Hoonah. Those that handled crabs in central Alaska were the Alaska Sea Products, Inc., the Northern Sea Food Co., and Ed Pfister, all at Cordova. Employment was given to 87 whites, 11 natives, 4 Filipinos, and 1 Mexican. Products consisted of 66,453 pounds of cold-packed meat, valued at $16,744; 1,106 dozen crabs in the shell, valued at $1,098; and 223,536 pounds canned (760 cases of 1-pound cans and 7,794 cases of ½-pound cans, 48 cans to the case), valued at $73,112. The total value of products in 1932 was $90,954, as compared with $42,066 in 1931, an increase of 116 percent.

JAPANESE VESSELS IN BERING SEA

For the third successive season the catching and canning of spider crabs was carried on in Bering Sea by Japanese interests. In 1932, as in the previous year, the floating cannery *Nagato Maru* was engaged in the industry, operating off the north coast of the Alaska Peninsula from the vicinity of Amak Island to Port Moller, and well outside the Territorial waters of Alaska, for a period of about 4 months, beginning in the early part of May. Two auxiliary motor vessels, the *Kasuga Maru* and *Ise Maru*, both of less than 50 tons, accompanied the cannery ship, and 10 small fishing boats were used to work the crab nets.

The *Nagato Maru* carried a crew of about 45 men and about 400 persons employed in the fishing and canning operations. It was reported that about 9,000 crabs were caught daily and that the total pack during the season was about 33,000 cases (ninety-six ½-pound cans to the case). The supply ship *Seiten Maru* visited the vessel from the 18th to the 20th of June, delivering various supplies and taking aboard a cargo of the crab catch for transportation to Japan.

TROUT

A negligible amount of trout was reported by commercial fishery operators in Alaska in 1932. The output in the southeastern dis-

trict was prepared by companies engaged primarily in other lines, while in central Alaska three operators handled fresh and frozen trout, giving employment to six white fishermen. The products from both districts were as follows: Dolly Vardens, 4,582 pounds fresh, valued at $458, and 5,922 pounds frozen, valued at $360; steelheads, 594 pounds frozen, valued at $7, and 26 cases (1,248 pounds) canned, valued at $117. The total production of both species was 12,346 pounds, valued at $942, as against 87,530 pounds valued at $7,202 in 1931.

MISCELLANEOUS FISHERY PRODUCTS

Several species of fish of minor commercial importance are taken in small quantities, chiefly in connection with the halibut fishery, and are landed at ports of Alaska and British Columbia and at Seattle. Such products landed in Alaska in 1932 were as follows: Sablefish, 43,705 pounds fresh, valued at $1,281, 12,240 pounds frozen, valued at $192, and 30,774 pounds pickled, valued at $905; rockfishes, 762 pounds, fresh, valued at $18, and 2,000 pounds frozen, valued at $30; and smelt, 5,100 pounds fresh, valued at $357. The last-named product was from central Alaska and the others were from the southeastern district.

FUR-SEAL INDUSTRY

PRIBILOF ISLANDS

GENERAL ADMINISTRATIVE WORK

In the calendar year 1932, 49,336 fur-seal skins were taken on the Pribilof Islands, of which 39,490 were from St. Paul Island and 9,846 from St. George Island. On St. Paul Island 32,029 sealskins were blubbered in the course of curing operations. The killings were confined as far as possible to 3-year-old male seals, and an adequate number of these animals was reserved in order to provide for the future breeding stock. Attention was given to the management of a herd of blue foxes on both St. Paul and St. George Islands, and in the 1932–33 season 1,143 pelts were obtained.

Work was continued on the construction of a community house and Government house on St. Paul Island and of additional buildings needed for the proper conduct of the sealing industry. Some extension of improved roads was made, which will expedite the transportation of sealskins from the killing grounds to the villages for curing and packing.

The Navy Department detailed the U.S.S. *Sirius* to transport the general supplies for the Pribilof Islands and to bring out the season's take of sealskins on the return trip to Seattle. Smaller quantities of freight were transported between Seattle and the islands by the Bureau's power vessel *Penguin*.

The U.S. Coast Guard maintained a patrol in Bering Sea and other waters of the North Pacific for the protection of the Pribilof Islands fur-seal herd. Two vessels of the Bureau participated in this work during the spring migration of the herd, and two others, while policing the region, made investigations regarding the reestablishment of the sea otter in Alaskan waters.

Two public auction sales of sealskins were held in 1932, from the proceeds of which payment was made, as heretofore, to the Canadian and Japanese Governments of their respective shares under the provisions of the fur-seal treaty. The United States' share of fur-seal skins taken by the Japanese Government in 1932 was received at St. Louis in December.

TRANSPORTATION OF SUPPLIES

Through the cooperation of the Navy Department, the U.S.S. *Sirius* transported the major portion of the general supplies required for the Pribilof Islands. The vessel sailed from Seattle on July 22, with 1,045 tons of general supplies, 1,365 tons of coal, 109,605 board feet of lumber, 27,000 shingles, and 5 passengers for the Bureau, and arrived at the islands on July 30. The *Sirius* left the islands on August 12, carrying a cargo of 49,337 fur-seal skins, miscellaneous freight, and 3 passengers for the Bureau. Seattle was reached on August 19.

Six minor shipments of supplies, aggregating 1,000 tons, were forwarded to the islands on the *Penguin* during the year.

POWER VESSEL "PENGUIN"

Since the power vessel *Penguin* was first put into service it has proved of great value in the Bureau's work at the Pribilof Islands. In addition to carrying shipments of supplies, chiefly perishable foodstuffs, from time to time, it has transported to and from Seattle employees who have been engaged in the fur-seal work at the islands, as well as persons in the naval radio service there. It has also been used in interisland work and in the transportation of natives from villages on the Alaska Peninsula for temporary labor in the sealing industry.

At the beginning of the year the *Penguin* was at Seattle undergoing minor repairs and a general overhauling. Five round trips were made between that port and the Pribilofs in 1932, and a sixth was begun in December. The dates of the voyages north were as follows: January 19 to February 11, April 19–30, June 11–21, August 15–26, October 2–14, and December 10, 1932, to January 5, 1933. Return trips from the Pribilofs to Seattle covered the following periods: February 17 to March 6, May 6–16, July 29 to August 7, September 11–21, and October 15–29.

In addition to a total of 1,000 tons of supplies, the vessel carried on its northward voyages 61 passengers, of whom 56 were Bureau employees, 4 were for the account of the Navy, and 1 the priest at St. Paul Island. On the trips from the islands to Seattle there were transported the season's take of fox skins, a shipment of live fur seals and rosy finches for the National Zoological Park at Washington, D.C., items of miscellaneous freight, and 63 passengers, of whom 55 were for the Bureau, 7 for the Navy, and 1 the St. Paul Island priest. A number of employees for the Navy Service also were furnished passage between Seattle and Dutch Harbor, and for the Bureau from Dutch Harbor and Chignik to Seattle. Fifty-three natives were transported from various villages along the peninsula for work at the islands during the sealing season and were returned

to their homes thereafter. In September the Bureau's launch *Puffin* was lifted aboard at Ketchikan and taken to Seattle. During the year the *Penguin* cruised 28,575 nautical miles.

ROADS

St. Paul Island.—In 1932, 4,400 feet of the Northeast Point road and 250 feet of a branch road to Lukanin were surfaced with scoria. One and one-half miles of plank were laid also, completing that part of the construction of the Northeast Point road except for short distances where small sand dunes are to be leveled before the planking can be done. To insure safety of the trucks it will be necessary to complete the road by surfacing with scoria and by building fences in a number of places to prevent the drifting of sand.

St. George Island.—Further work was done on grading the road to East rookery, with the result that for a distance of about 2½ miles the road is in condition to permit using a truck and trailer for hauling skins. An extension was made of the road from St. George village to North and Staraya Artil rookeries, between 500 and 600 feet being surfaced with scoria in 1932. This will enable the use of better killing grounds next year and will reduce the long drives formerly necessary on St. George Island.

BUILDINGS

St. Paul Island.—The building program at St. Paul Island in 1932 was largely a continuation of the work begun in the previous year. The 46 by 100 foot washhouse and the 36 by 50 foot extension to the salt house were completed, and a part of the equipment was set up before the beginning of the sealing season. Both buildings have an overhead track and a trolley for carrying sealskins.

All outside work, as well as a portion of the inside work, was completed on the 32 by 54 foot bunkhouse for sealing assistants. In the basement are a wash room, a large room for use as a recreation room or dining room, a kitchen, and cook's quarters. On the main floor there are six sleeping rooms and a living room. The building, which will be completed during the winter of 1932–33, will accommodate 36 men.

The new 33 by 70 foot community house will also be completed during the winter. In the basement, the walls and floor of which are of cement, there are baths and toilets for men and women, a storage room, and a room that it is planned to equip eventually for bowling. On the main floor are a library, a card and pool room for men, a barber shop, and a large assembly room for women. The upper floor has one large room only, which is to be used for dancing, motion pictures, and basket ball and other games.

The new Government house, 34 by 56 feet, was completed in the spring of 1932. A cement foundation and basement were put under the old company house and a central heating system and plumbing were installed during the following winter. Some alterations were made in the machine shop to permit more efficient use of the machinery. A cement wall for protection from storms and the sea was placed around the intake in the water supply system used for obtain-

ing salt water to wash the sealskins. A new windmill was erected at Icehouse Lake to replace the one blown down in the winter of 1931–32.

The East Landing dock of reinforced concrete, 50 by 225 feet, was completed during the year, and the construction of boatways alongside it was begun. Although the dock had not been finished prior to the arrival of the supply vessel, it was made ready for temporary use by covering with plank. It was of great value in facilitating the unloading of supplies, as the work was carried on continuously there, while at the West Landing it would have been possible to unload cargo only part of 1 day during the entire time the vessel was at the island. Thus the use of the East Landing dock not only permitted the supply ship to depart considerably earlier than would have been possible otherwise, but it also released promptly for other work about 100 persons who assisted in the discharge of the cargo.

St. George Island.—A garage, 28 by 50 feet, with cement foundation and floor, was built in 1932, and a 16 by 60 foot addition was made to the warehouse. A slip was excavated alongside and at the rear of the dock so that the truck may be driven on the dock.

NATIVES

CENSUS

The annual census, taken as of December 31, 1932, showed 232 native residents on St. Paul Island. In addition, 1 St. Paul Island native was in a Seattle hospital, making a total of 233 credited to the island. During the year 3 natives departed to take up permanent residence on St. George Island. There were 9 births and 12 deaths among the natives. The census figure has been decreased also by the withdrawal of the name of the Russian priest who has been on St. Paul Island since 1929 and who has heretofore been listed as belonging to the native population.

On St. George Island there were 153 native residents as of December 31, 1932. Three natives from St. Paul Island became permanent residents of St. George Island. There were 9 births and 3 deaths during the year.

The total population credited to both islands on December 31, 1932, was 386, a net increase of 2 over the figures for the preceding year.

MEDICAL SERVICES

Two physicians were stationed at the Pribilof Islands, as in previous years, to render medical aid to the inhabitants. A dentist also was on duty throughout the year. Health conditions in general were good, except for an epidemic of influenza during August and September.

SCHOOLS

The Bureau maintains schools for the native children on St. Paul and St. George Islands, two teachers being employed on each island.

St. Paul Island.—The 1931–32 school year began September 1, 1931, and closed May 27, 1932. There were 14 boys and 19 girls enrolled in the junior and 15 boys and 17 girls in the senior school, a total of 65 pupils.

St. George Island.—The school opened on September 8, 1931, and closed May 5, 1932. In the junior school 17 pupils were enrolled and in the senior school 20, a total of 37 pupils.

SAVINGS ACCOUNTS

As in previous years, the Commissioner of Fisheries had in his custody certain funds of the Pribilof Islands natives and of the native church on St. Paul Island. These funds were kept on deposit in the Washington Loan & Trust Co., Washington, D.C. On July 20 they were transferred from a regular checking account, upon which the interest rate had been reduced to 1 percent as of July 1, to a savings account bearing interest at the rate of 3 percent per annum. Interest was calculated on monthly balances and credited semiannually. One account was closed during the year. A summary of the accounts as a whole for the year 1932 is shown in the statement that follows:

On hand Jan. 1, 1932	$8,566.65
Interest earned from Jan. 1 to Dec. 31, 1932	188.74
	8,755.39
Withdrawn by natives and native church	1,840.17
On hand Dec. 31, 1932	6,915.22

An itemized statement of the funds, showing the individual accounts, follows:

Funds of the Pribilof Islands natives in the custody of the United States Commissioner of Fisheries, as trustee, Dec. 31, 1932

Gromoff, Iuliania	$359.71	Merculief, Erena	$683.20
Kochutin, Alexandra	3,387.36	Merculief, George	98.57
Kozloff, Marina	120.81	Merculief, George, Jr	64.71
Kozloff, Raisa	113.39	Merculief, Tatiana	683.20
Krukoff, Martha	.80	Morgan, Ouliana (Fratis)[1]	.32
Lekanof, Sophia M	83.86	Pankoff, Agrippina	185.25
Lestenkof, Michael	382.30	Sedick, Lavrenty	135.24
Merculief, Alexandra	152.05		
Merculief, Daniel	464.45	Total	6,915.22

PAYMENTS FOR TAKING FUR-SEAL SKINS

For their work in taking and curing sealskins the natives of the Pribilof Islands were paid in cash at the rate of 65 cents for each skin taken. This was 10 cents per skin less than the rate allowed in the previous year. The payments were distributed among the men and boys who engaged in the work in accordance with their rated skill and ability. On each island the persons entitled to this compensation were divided into classes, and each individual in a given class received the same amount. In addition, small bonuses in cash were paid for special work in connection with sealing operations. Payments were made as shown on following page.

[1] Not living on Pribilof Islands in 1932.

St. Paul Island.—For the 39,490 sealskins taken on St. Paul Island the sum of $25,668.50 was paid, and in addition $100 was allowed 2 foremen for special services and $80 for 4 mess attendants. A statement of the earnings follows:

Payments to St. Paul Island natives for taking fur-seal skins, calendar year 1932

Classification	Number of men	Share of each	Total	Classification	Number of men	Share of each	Total
First class	31	$522.60	$16,200.60	Foreman (additional compensation)			60.00
Second class	14	432.25	6,051.50	Do			40.00
Third class	7	312.00	2,184.00	Mess attendants, 4 at $20 each			80.00
Fourth class	4	243.10	972.40				
Fifth class	4	45.50	182.00				
Boys' class	4	19.50	78.00	Total			25,848.50

St. George Island.—For the 9,846 sealskins taken on St. George Island the sum of $6,399.90 was paid and, in addition, $100 was allowed two foremen for special services. A statement of the earnings follows:

Payments to St. George Island natives for taking fur-seal skins, calendar year 1932

Classification	Number of men	Share of each	Total	Classification	Number of men	Share of each	Total
First class	23	$192.40	$4,425.20	Foreman (additional compensation)			$55.00
Second class	7	153.40	1,073.80	Do			45.00
Third class	5	119.60	598.00				
Fourth class	2	85.80	171.60				
Fifth class	2	65.65	131.30	Total			6,499.90

PAYMENTS FOR TAKING FOX SKINS

The natives were paid $5 in cash for each fox skin taken on the Pribilof Islands in the 1931–32 season. The total payments amounted to $1,570 for the 314 skins taken on St. Paul Island and $5,560 for the 1,112 skins taken on St. George Island, a total of $7,130.

FUR SEALS

QUOTAS FOR KILLING AND RESERVING

The Acting Secretary of Commerce approved the Bureau's recommendation of March 29, 1932, that about five thousand 3-year-old male fur seals, divided between St. Paul Island and St. George Island in approximately the ratio of 4 to 1, be marked and reserved for future breeding stock and that the remainder of the 3-year-old males available be killed. The plan provided, also, that if the count of harem and idle bulls during the season indicated that a larger reserve was advisable it should be made.

KILLINGS

In 1932, 49,336 fur seals were killed, of which 39,490 were taken on St. Paul Island and 9,846 on St. George Island. Details in regard to the killings are shown in the following tabulations:

Seal killings on Pribilof Islands in 1932

ST. PAUL ISLAND

Date	Serial no. of drive	Hauling ground	Skins secured
June 6	1	Sea Lion Rock (Sivutch)	103
15	2	Gorbatch	304
17	3	Tolstoi	87
18	4	Zapadni	167
20	5	Polovina	239
21	6	Vostochni and Morjovi	626
22	7	Tolstoi, Lukanin, and Kitovi	153
23	8	Zapadni and Little Zapadni	341
24	9	Reef and Gorbatch	1,489
25	10	Polovina and Little Polovina	211
26	11	Vostochni and Morjovi	1,142
27	12	Tolstoi, Lukanin, and Kitovi	388
28	13	Zapadni and Little Zapadni	746
29	14	Reef and Gorbatch	2,443
30	15	Polovina and Little Polovina	297
July 1	16	Vostochni and Morjovi	1,471
2	17	Tolstoi, Lukanin, and Kitovi	602
3	18	Zapadni and Little Zapadni	1,117
5	19	Reef and Gorbatch	3,122
6	20	Polovina and Little Polovina	905
7	21	Vostochni and Morjovi	1,866
8	22	Tolstoi, Lukanin, and Kitovi	385
9	23	Zapadni and Little Zapadni	1,135
10	24	Reef and Gorbatch	2,207
11	25	Polovina and Little Polovina	482
12	26	Vostochni and Morjovi	1,608
13	27	Tolstoi, Lukanin, and Kitovi	602
14	28	Zapadni and Little Zapadni	480
15	29	Reef and Gorbatch	1,575
16	30	Polovina and Little Polovina	717
17	31	Vostochni and Morjovi	1,777
18	32	Tolstoi, Lukanin, and Kitovi	723
19	33	Zapadni and Little Zapadni	1,617
20	34	Reef and Gorbatch	2,013
21	35	Tolstoi, Lukanin, Kitovi, Polovina, and Little Polovina	759
22	36	Vostochni and Morjovi	1,024
23	37	Zapadni and Little Zapadni	750
24	38	Reef and Gorbatch	1,176
25	39	Tolstoi, Lukanin, Kitovi, Polovina, and Little Polovina	580
26	40	Vostochni and Morjovi	451
27	41	Zapadni and Little Zapadni	397
28	42	Reef and Gorbatch	850
29	43	Tolstoi, Lukanin, Kitovi, Polovina, and Little Polovina	360
30-31	-------	Skins from seals that died as a result of reserving operations	3
		Total	39,490

ST. GEORGE ISLAND

June 2	1	North	24
8	2	----do	33
14	3	----do	116
15	4	East	191
17	5	Zapadni	48
19	6	North and Staraya Artil	190
20	7	East	163
21	8	Zapadni	35
23	9	North and Staraya Artil	247
24	10	East	195
25	11	Zapadni	53
27	12	North and Staraya Artil	329
28	13	East	119
29	14	Zapadni	122
July 1	15	North and Staraya Artil	468
2	16	East	431
3	17	Zapadni	98
5	18	North and Staraya Artil	632

Seal killings on Pribilof Islands in 1932—Continued

ST. GEORGE ISLAND—Continued

Date	Serial no. of drive	Hauling ground	Skins secured
July 6	19	East	539
7	20	Zapadni	317
9	21	North and Staraya Artil	540
10	22	East	237
11	23	Zapadni	352
13	24	North and Staraya Artil	436
14	25	East	407
15	26	Zapadni	75
17	27	North and Staraya Artil	1,018
18	28	East	317
19	29	Zapadni	204
21	30	North and Staraya Artil	679
22	31	East	262
25	32	North and Staraya Artil	460
26	33	East	144
28	34	North and Staraya Artil	361
30	-------	Skins from seals killed during reserving operations	2
Aug. 1	-------	----do	2
		Total	9,846

AGE CLASSES

The age class of a male seal belonging to the Pribilof Islands herd is determined from the length of its body. The classification was derived from the measurements of a large number of pups branded in 1912 and killed in subsequent years. The limits of the various age classes are shown in the table following:

Age classes of male seals, Pribilof Islands

Age	Length of summer seals	Length of fall seals	Age	Length of summer seals	Length of fall seals
	Inches	*Inches*		*Inches*	*Inches*
Yearlings	Up to 36.75	Up to 38.75.	4-year olds	46 to 51.75	48 to 53.75.
2-year-olds	37 to 40.75	39 to 42.75.	5-year-olds	52 to 57.75	54 to 59.75.
3-year-olds	41 to 45.75	43 to 47.75.	6-year-olds	58 to 63.75	60 to 65.75.

Ages of seals killed on Pribilof Islands, calendar year 1932

[On basis of classification shown in preceding table]

Age	St. Paul Island	St. George Island	Total	Age	St. Paul Island	St. George Island	Total
2-year-old males	920	158	1,078	Cows [1]	45	59	104
3-year-old males	38,113	9,512	47,625				
4-year-old males	411	117	528	Total	39,490	9,846	49,336
5-year-old male	1	-------	1				

[1] Cows unavoidably and accidentally killed or found dead.

Some of the seals recorded in the above tabulation as 2-year-olds and 4-year-olds probably were 3-year-olds. Not all the male seals of a given age fall within the length limits assigned for the males of that age. As far as possible, the killings in 1932 were confined to 3-year-old males.

RESERVING OPERATIONS

In accordance with the practice begun in 1927, the marking of the breeding stock was done at the close of killing operations so that the reserved animals need not be subjected to repeated drives. As killings were carried on somewhat later than usual in 1932 because the seals were slow in hauling out during the latter half of the season, the time that could be given to marking the reserve was shortened. The work at St. Paul Island was interrupted on August 1 by the arrival and unloading of the supply ship, and therefore fewer seals were marked than had been planned. The total number of 3-year-old males marked was 3,009, of which 1,200 were on St. Paul Island and 1,809 on St. George Island. Large numbers of unmarked seals of that age class were observed on the hauling grounds later, assuring an ample stock for future breeding requirements. Details in regard to the marking operations are as follows:

Marking of 3-year-old male fur seals for breeding reserve, Pribilof Islands, 1932

ST. PAUL ISLAND

Date	Hauling ground driven	Number of seals marked
July 30	Vostochni and Morjovi	729
31	Gorbatch	471
	Total	1,200

ST. GEORGE ISLAND

July 23	Zapadni	99
29	Do	70
	South	200
30	East	315
31	North and Staraya Artil	360
Aug. 1	Staraya Artil	390
2	East	375
	Total	1,809

COMPUTATION OF FUR-SEAL HERD

The computation of the fur-seal herd in 1932 was made by Supt. H. J. Christoffers. As of August 10 the total of all classes was 1,219,961—a numerical increase of 92,879 and a percentage increase of 8.24 over the figures for the preceding year. The detailed report will be found on pages 72 to 78 of this document. Following is a comparative statement of the numerical strength of the various elements of the fur-seal herd in the years 1921 to 1932, inclusive:

General comparison of computations of the seal herd on the Pribilof Islands, 1921 to 1932

Classes	1921	1922	1923	1924	1925	1926
Harem bulls	3,909	3,562	3,412	3,516	3,526	4,034
Breeding cows	176,655	185,914	197,659	208,396	226,090	244,114
Surplus bulls	3,301	2,346	1,891	2,043	3,558	2,002
Idle bulls	747	508	312	390	311	423
6-year-old males	3,991	3,771	4,863	8,489	4,105	13,434
5-year-old males	4,729	6,080	10,612	5,132	16,792	16,812
4-year-old males	6,780	11,807	5,710	18,670	18,692	17,872
3-year-old males	14,668	7,459	22,786	21,551	21,185	17,189
2-year-old males	41,893	40,920	43,112	45,685	43,515	38,183
Yearling males	50,249	52,988	55,769	59,291	52,091	56,514
2-year-old cows	43,419	46,280	48,801	51,359	49,786	44,415
Yearling cows	54,447	57,413	60,422	64,240	57,309	62,175
Pups	176,655	185,914	197,659	208,396	226,090	244,114
Total	581,443	604,962	653,008	697,158	723,050	761,281

Classes	1927	1928	1929	1930	1931	1932
Harem bulls	4,643	6,050	7,187	8,312	9,233	10,088
Breeding cows	263,566	284,725	307,491	332,084	358,642	387,320
Surplus bulls	4,827	5,285	5,207	3,963	3,291	2,893
Idle bulls	972	1,449	1,633	1,899	1,888	2,349
6-year-old males	13,450	12,857	10,399	5,612	6,553	8,154
5-year-old males	16,073	13,001	7,016	8,191	10,193	11,669
4-year-old males	14,448	7,798	9,102	11,327	12,966	11,351
3-year-old males	9,730	11,133	13,639	14,871	13,198	17,849
2-year-old males	41,252	49,087	64,354	69,674	74,828	81,101
Yearling males	61,026	65,861	85,381	92,232	99,612	107,592
2-year-old cows	48,186	57,061	67,210	72,605	78,410	84,682
Yearling cows	67,131	72,481	85,417	92,247	99,626	107,593
Pups	263,566	284,725	307,491	332,084	358,642	387,320
Total	808,870	871,513	971,527	1,045,101	1,127,082	1,219,961

FOXES

The management of blue-fox herds on St. Paul and St. George Islands is given regular attention. In winter when the supply of natural food is scarce the foxes are fed preserved seal meat and specially prepared rations. Captures are made then for obtaining pelts and for marking and releasing a suitable number of animals for breeding purposes.

TRAPPING SEASON OF 1932–33

During the 1932–33 season there were taken 1,143 fox pelts, of which 1,120 were blue and 23 white. Two hundred and forty-nine blue and 22 white pelts were taken on St. Paul Island, and 871 blue pelts and 1 white pelt on St. George Island. There were also trapped, marked, and released for breeding stock 32 foxes on St. Paul Island and 408 on St. George Island. Additional animals, not captured during the season, augment the breeding reserve.

REINDEER

St. Paul Island.—A count of the reindeer on St. Paul Island on September 30, 1932, showed 485 animals, of which 57 were the young of the season. During the year 47 reindeer had been killed and used for food. The herd was apparently in excellent condition.

St. George Island.—The reindeer herd on St. George Island as of September 28, 1932, contained 57 animals, of which 10 were the young of the season. None had been used for food on this island during the year.

FUR-SEAL SKINS

SHIPMENTS

Shipment of the 49,336 fur-seal skins taken on the Pribilof Islands in the calendar year 1932 was made on the U.S.S. *Sirius*, which arrived at Seattle, Wash., on August 19. There was also included in the shipment 1 sealskin of the previous season's take that had been inadvertently left in salt at St. George Island when the skins were being packed.

SALES

In 1932 there were sold at two public auction sales 33,715 fur-seal skins taken on the Pribilof Islands, and in addition 281 skins taken on those islands were disposed of at special sales. The first public auction sale was held at New York City on June 13 and the second at St. Louis, Mo., on September 26. In the following statements the sales of other fur-seal skins by the Department of Commerce for the account of the Government are included, in order that the record may be complete.

Public auction sale, June 13, 1932.—At this sale 7,236 fur-seal skins taken at the Pribilof Islands, dressed, dyed, and machined, sold for $102,328.05. The number of skins offered for sale was 25,700, but all except 7,236 were withdrawn without being sold.

Public auction sale, September 26, 1932.—At the September sale 26,479 fur-seal skins taken at the Pribilof Islands sold for $296,604.75. These skins consisted of 25,678 dressed, dyed, and machined, which brought $296,131.50, and 801 miscellaneous, unhaired and raw salted, which brought $473.25. There were also sold 31 confiscated skins, raw, for $15.50, making a total of $296,620.25 for fur-seal skins at this sale.

Special sales.—During the year 1932, 281 fur-seal skins taken at the Pribilof Islands were sold at special sales for $4,528.28. Of these skins, 263 were dressed, dyed, and machined, 82 being of the black dye and 181 logwood brown; 10 were raw salted; and 8 were specially prepared 4-way skins for exhibition purposes.

The following tables give further details in regard to the sales of fur-seal skins by the Department of Commerce for the account of the Government in 1932:

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1932

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total price	Percentage
DYED BLACK										
Extra extra large:										
June 13	III	2	$3.50	$3.50	$3.50	$7.00	2	$3.50	$7.00	0.06
Sept. 26	Scarred, faulty, etc	5	16.00	16.00	16.00	80.00	5	16.00	80.00	.03
Extra large:										
June 13	I and II	20	41.00	41.00	41.00	820.00	52	25.62	1,332.00	1.37
	Scarred, faulty, etc	32	16.00	16.00	16.00	512.00				
Sept. 26	I and II	15	23.50	16.75	22.60	339.00	39	17.88	697.25	.25
	Scarred, faulty, etc	22	16.00	15.75	15.81	347.75				
	III	2	5.25	5.25	5.25	10.50				
Large:										
June 13	I and II	718	41.00	18.00	19.70	14,143.00	1,348	17.17	23,143.00	35.59
	Scarred, faulty, etc	603	16.00	13.50	14.77	8,905.50				
	III	27	3.50	3.50	3.50	94.50				
Sept. 26	I and II	869	23.50	16.75	21.28	18,493.00	2,066	17.57	36,302.75	13.31
	Scarred, faulty, etc	1,088	16.50	15.25	15.86	17,251.00				
	III	109	5.25	4.50	5.13	558.75				
Medium:										
June 13	I and II	1,438	15.00	14.25	14.71	21,150.80	2,049	13.90	28,481.80	54.09
	Scarred, faulty, etc	560	13.00	12.75	12.79	7,160.00				
	III	51	3.50	3.25	3.35	171.00				
Sept. 26	I and II	4,581	16.75	12.25	14.01	64,191.75	9,512	12.17	115,740.50	61.29
	Scarred, faulty, etc	4,757	11.50	9.75	10.67	50,760.00				
	III	174	5.00	3.50	4.53	788.75				
Small medium:										
June 13	I and II	270	12.75	12.50	12.67	3,420.00	337	10.76	3,626.00	8.89
	III	67	3.25	3.00	3.07	206.00				
Sept. 26	I and II	1,759	10.00	9.00	9.53	16,767.75	3,899	8.26	32,212.00	25.12
	Scarred, faulty, etc	2,074	7.75	7.00	7.33	15,201.50				
	III	66	3.75	3.50	3.68	242.75				
All classes:										
June 13							3,788	14.94	56,589.80	100.00
Sept. 26							15,521	11.92	185,032.50	100.00

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1932—Continued

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total price	Percentage
DYED LOGWOOD BROWN										
Extra extra large:										
June 13	Scarred, faulty, etc	7	$13.25	$13.25	$13.25	$92.75	8	$12.09	$96.75	0.23
	III	1	4.00	4.00	4.00	4.00				
Extra large:										
June 13	I and II	26	19.50	17.75	18.63	484.25	68	14.76	1,003.75	1.97
	Scarred, faulty, etc	38	13.25	13.25	13.25	503.50				
	III	4	4.00	4.00	4.00	16.00				
Sept. 26	I and II	9	19.25	19.25	19.25	173.25	29	15.28	443.25	.29
	Scarred, faulty, etc	20	13.50	13.50	13.50	270.00				
Large:										
June 13	I and II	509	19.50	17.50	18.32	9,327.00	997	15.73	15,681.00	28.91
	Scarred, faulty, etc	468	15.50	12.75	13.41	6,274.00				
	III	20	4.00	4.00	4.00	80.00				
Sept. 26	I and II	766	20.75	19.00	19.76	15,138.00	1,396	17.22	24,033.00	13.74
	Scarred, faulty, etc	630	15.00	13.50	14.12	8,895.00				
Medium:										
June 13	I and II	1,384	14.50	13.75	14.07	19,468.00	2,158	12.78	27,578.50	62.59
	Scarred, faulty, etc	613	13.00	11.50	12.27	7,522.50				
	III	161	4.25	3.00	3.65	588.00				
Sept. 26	I and II	1,990	14.00	12.00	12.91	25,697.50	5,560	11.18	62,156.25	54.74
	Scarred, faulty, etc	3,570	11.00	9.75	10.21	36,458.75				
Small medium:										
June 13	I and II	75	12.50	12.50	12.50	937.50	217	6.35	1,378.25	6.30
	III	142	3.50	2.50	3.10	440.75				
Sept. 26	I and II	1,320	9.50	8.25	8.70	11,487.50	3,172	7.71	24,466.50	31.23
	Scarred, faulty, etc	1,852	7.50	6.75	7.01	12,979.00				
All classes:										
June 13							3,448	13.27	45,738.25	100.00
Sept. 26							10,157	10.94	111,099.00	100.00
MISCELLANEOUS										
Sept. 26	Unhaired and dressed	138	.75	.75	.75	103.50	801	.59	473.25	100.00
	Dressed in hair	12	1.50	1.50	1.50	18.00				
	Raw salted	378	.75	.75	.75	283.50				
	Partly unhaired	273	.25	.25	.25	68.25				

Special sales of Pribilof Islands fur-seal skins in 1932

Date	Number of skins	Description	Price per skin	Total
Mar. 31	50	Dyed black, medium	$18.23	$911.50
	50	Dyed logwood brown, medium	17.28	864.00
June 3	25	Dyed black, medium	14.71	367.75
	25	Dyed logwood brown, medium	14.07	351.75
Dec. 31	35	Dyed logwood brown, large	18.32	641.20
	65	Dyed logwood brown, medium	14.07	914.55
	8	4-condition exhibition skins	25.00	200.00
	2	Raw salted	7.98	15.96
	8	do	5.46	43.68
	3	Dyed black, large	21.28	63.84
	4	Dyed black, medium	14.01	56.04
	3	Dyed logwood brown, large	19.76	59.28
	3	Dyed logwood brown, medium	12.91	38.73
	281			4,528.28

DISPOSITION OF FUR-SEAL SKINS TAKEN AT PRIBILOF ISLANDS

On January 1, 1932, there were on hand 62,296 fur-seal skins taken at the Pribilof Islands. Of these, 62,278 were at St. Louis, Mo., and 18 at Washington. In addition, 6 skins taken on St. George Island in the calendar year 1932 were unaccounted for. Later it was found that 1 of these had been inadvertently left in salt at the island, and 5 had been included in the shipment to St. Louis, making a total of 62,283 on hand at that place and a grand total of 62,302 skins. In 1932, 49,336 Pribilof Islands skins were taken and 34,000 were disposed of, leaving 77,638 on hand on December 31, 1932. The following tables show further details in regard to fur-seal skins taken on the Pribilof Islands, as well as details in regard to other Government-owned fur-seal skins under the control of the Department of Commerce.

Summary of Government-owned fur-seal skins in the custody of Fouke Fur Co., at St. Louis, Mo., calendar year 1932

Source	On hand Jan. 1	Receipts in 1932	Disposed of in 1932	On hand Dec. 31
Taken on Pribilof Islands:				
Calendar year 1929	526		[1] 526	
Calendar year 1930	12,234		[1] 12,234	
Calendar year 1931	[2] 49,523	1	[3] 21,254	28,270
Calendar year 1932		49,336		49,336
United States' share of Japanese fur-seal skins:				
Season of 1930	172			172
Season of 1931		170		170
Season of 1932		170		170
Confiscated fur-seal skins	31	1	[1] 31	1
Total	62,486	49,678	34,045	78,119

[1] Sold.
[2] Includes 5 skins unaccounted for at close of 1931 which were subsequently found when shipment was unpacked at St. Louis.
[3] 21,236 sold; 14 made into coats and shipped to Washington for display purposes; 4 used by U.S. Bureau of Standards in making tests.

Summary of all Government-owned fur-seal skins under control of Department of Commerce, calendar year 1932

Source	Pribilof Islands	On hand Jan. 1			Receipts in 1932	Sales in 1932	Used for tests	On hand Dec. 31		
		Fouke Fur Co.	Washington office	Total				Fouke Fur Co.	Washington office	Total
Taken on Pribilof Islands:										
Calendar year 1918, held for reference purposes			7	7					7	7
Calendar year 1923			3	3					3	3
Calendar year 1924			1	1					1	1
Calendar year 1929		526	5	531		526			5	5
Calendar year 1930		12,234	2	12,236		12,234			2	2
Calendar year 1931	[1] 1	[2] 49,523		49,524		21,236	4	28,270	[3] 14	28,284
Calendar year 1932					49,336			49,336		49,336
Miscellaneous skins held for reference purposes			4	4					4	4
United States' share of Japanese sealskins:										
Season of 1930		172		172				172		172
Season of 1931					170			170		170
Season of 1932					170			170		170
Confiscated skins		31		31	1	31		1		1
Total	1	62,486	22	62,509	49,677	34,027	4	78,119	36	78,155

[1] Skin unaccounted for at close of 1931 was subsequently found in salt at the islands.
[2] Includes 5 skins unaccounted for at close of 1931 which were subsequently found when shipment was unpacked at St. Louis.
[3] Skins made up into coats for display purposes.

SHIPMENT AND SALE OF FOX SKINS

The 289 blue and 25 white fox skins taken on St. Paul Island in the 1931–32 season were shipped to Seattle on the *Penguin*, sailing from the islands on February 17, and the 1,112 blue fox skins taken on St. George Island during the season were shipped on the same vessel on May 6. Both shipments were forwarded promptly by express from Seattle to the Department's selling agents at St. Louis, Mo.

At the public auction sale in New York City on June 13, 1932, there were sold 444 blue fox skins that remained from the take on the Pribilof Islands in the 1930–31 season. These skins sold for $8,544.50, an average of $19.24 per skin, the maximum price obtained being $59 for a single skin.

On September 26, 1932, there were sold at public auction at St. Louis 719 blue and 25 white fox skins taken on the Pribilof Islands in the 1931–32 season. The blue pelts brought $12,175, an average of $16.93 per skin, and the white pelts brought $336.50, an average of $13.46 per skin. The maximum price per skin was $49, obtained for two blue pelts sold in one lot.

FUR-SEAL PATROL

UNITED STATES COAST GUARD

A patrol for the protection of the fur seals of the North Pacific was maintained, as in previous years, by the United States Coast Guard, which assigned six cutters and a 125-foot patrol boat to this work.

Beginning April 5 the *Snohomish* patrolled from the mouth of the Columbia River to Dixon Entrance until the fur-seal herd had passed. The *Tallapoosa* covered the area between Dixon Entrance and Kodiak Island from April 15 to 30 and between Kodiak Island and Unimak Pass from May 1 to 15. The *Tahoe* and the 125-foot patrol boat left San Francisco about the middle of April for Unalaska, where the former was based until July and the latter until the close of the season. The *Haida* and the *Itasca* also engaged in the fur-seal patrol in Bering Sea during the latter part of the season. On its annual cruise from San Francisco to the Arctic Ocean the *Northland* patrolled in Bering Sea and adjacent waters. The season's patrol extended as far westward as Attu, the westernmost island of the Aleutian Chain, and was prosecuted in each locality as long as the circumstances required.

BUREAU OF FISHERIES

From April 6 to May 24, inclusive, the *Brant* patrolled the waters in the vicinity of Cape Flattery. A representative of the Bureau of Fisheries was again on duty at La Push to secure compliance with the regulations prohibiting the use of firearms and motor boats in the taking of fur-seal skins by the Indians. The *Widgeon* was engaged in seal patrol in the vicinity of Sitka in April.

SEALING PRIVILEGES ACCORDED ABORIGINES

The North Pacific Sealing Convention of July 7, 1911, permits Indians and other aborigines dwelling on the coasts of the waters designated by the convention to take sealskins under limited conditions. In 1932 there were taken and duly authenticated by officials of the respective Governments 1,938 fur-seal skins, of which 151 were taken by Indians under the jurisdiction of the United States and 1,787 by Indians of Canada. The details are as follows:

Washington.—Seventy-three skins taken by Indians of Washington were authenticated. Of these, 26 were from male seals and 47 from females. The skins were taken by Indians of La Push and Neah Bay and were authenticated by John B. Holm, special agent of the Bureau, and by Raymond H. Bitney, superintendent of the Neah Bay Indian Agency, Neah Bay, Wash.

Alaska.—Seventy-eight skins taken by natives of Sitka were authenticated by Bureau employees. Of these skins, 25 were from male seals, 45 from females, and 8 from unborn pups. The seals from which the skins were obtained were taken in the waters off Biorka Island in the months of March to June, inclusive.

British Columbia.—An official report received by the Bureau stated that 1,787 fur-seal skins were taken by Indians of British Columbia in 1932.

JAPANESE SEALSKINS DELIVERED TO THE UNITED STATES

Under the terms of the North Pacific Sealing Convention there were allotted to the United States 170 Japanese fur-seal skins, or 10 percent of the number taken by Japan in territory under its jurisdiction in the year 1932. These skins were received by the Department's selling agents at St. Louis, Mo., on December 23, 1932.

FUR-SEALS AND BIRDS FOR EXHIBITION

Three live fur seals, 2 male and 1 female, from St. Paul Island and 19 rosy finches from St. George Island were forwarded on the *Penguin* in September for the National Zoological Park, Washington, D.C. One of the fur seals and 3 of the birds died en route. The remainder arrived at the Zoo in Washington on September 27, having been sent by express from Seattle.

Of the 3 fur seals delivered to the National Zoological Park in December 1928, 1 died a few weeks after arrival and another in September 1931. The surviving fur seal of that group on July 31, 1932, gave birth to a pup, which was stillborn. So far as known, this is the first fur seal born in captivity.

COMPUTATION OF FUR SEALS, PRIBILOF ISLANDS, 1932

By Harry J. Christoffers

The main purpose of a yearly computation of fur seals at the Pribilof Islands is to determine as accurately as possible the number of 3-year-old males, the killable seals, returning to the islands and whether sufficient numbers of this age class are being reserved for breeding purposes.

Through investigations during a series of years it has been determined that the average yearly rate of growth of the herd is approximately 8 percent. For the last several years there have been abnormal increases in the number of 3-year-old male seals at the islands; from 1928 to 1931, inclusive, it was possible to kill, consecutively, numbers representing increases of 26 percent, 33 percent, 9 percent, and 15 percent over the take of the previous year, without endangering the steady development of the herd. In 1932, however, there was no increase over the preceding year in the number killed.

The above-mentioned increases in killings are much greater than would normally have been expected. They may be attributed partly to the birth of a larger number of pups because more males were left for breeding purposes, and partly, no doubt, to unusually good conditions at sea, which reduced the mortality rate for the first 3 years of the life cycle. If the number of 3-year-old males continues to increase as it has in recent years, the 8 percent increase for the entire herd, as previously determined over a period of years, will no longer be applicable.

During the first half of the 1932 sealing season it appeared that there would be a large increase in the take. Through July 9 there had been taken 24,229 seals, as compared with 21,812 on the same date in 1931. From that date on, however, the killings were less than in the previous season, with the result that the total take of seals for 1932 was 49,336, of which 47,625 were classed as 3-year-old males, as against a total of 49,524, including 47,767 3-year-old males, in 1931.

The latter part of the season was marked by rather stormy weather, very unfavorable for the hauling out of seals. They seem to prefer to haul out in calm, warm weather, and they usually return to the water when there is a driving rain. This may account for the short take of skins. It is very likely that weather conditions affect

the hauling out of bachelor seals particularly, as these animals have not sexually matured, and there is no real reason for their visiting the islands. Moreover, a lack of food or a superabundance of natural enemies may have caused a higher mortality rate at sea this year than in other recent years. A great many whales were observed this season in the vicinity of the islands, which is rather unusual, and it is possible that an abundance of killer whales had something to do with the shortage of seals.

Because the weather was unfavorable for the hauling out of bachelor seals during the latter part of the season, killings were continued until July 29, after which the presence of large numbers of cows and 2-year-old males in the drives made further killings inadvisable.

From July 30 to August 2, 1,200 3-year-old males on St. Paul Island and 1,809 on St. George Island were marked for breeding stock by shearing a patch of fur. It would have been possible to mark many more, especially on St. Paul Island, but the annual supply vessel arrived there on August 1 and it was necessary to use all hands in unloading cargo. Subsequent observations showed a large number of 3-year-old males on the various hauling grounds.

BULLS

A census was again taken of harem and idle bulls. As usual, it was necessary to estimate the numbers on some inaccessible portions of rookeries, but it is felt that these estimates and the actual number counted approximate very closely the total number of bulls on the islands this season.

At the time the census was taken large numbers of surplus breeding bulls were still on the hauling grounds, showing that the number reserved the last 7 years was ample to take care of all breeding requirements. This surplus is very necessary, or many virgin cows that arrive after the breeding rookeries have broken up will not be served.

Harem areas have been enlarged considerably in recent years, but with the exception of North rookery on St. George Island there was little expansion in 1932. The cows, however, were crowded together more closely than formerly, a condition indicating that next season sparsely populated harems will appear in the rear of the rookeries.

Sivutch rookery, on Sea Lion Rock, was not counted. As this rookery has almost reached the limit of expansion, a very small increase was added to the estimates for the previous year. There was a considerable decrease in the number of harems on Ardiguen rookery, St. Paul Island, for which no reason can be ascribed.

A great many badly injured bulls were observed in the vicinity of Morjovi rookery. The injuries were probably caused by numerous idle or surplus bulls from Vostochni hauling grounds that had roamed to the vicinity of Morjovi in search of harem positions. The beach line of the entire Vostochni harem area is very thickly populated, and late-arriving bulls, not finding satisfactory positions in the rear, might therefore make raids on the Morjovi harems. This is not a common occurrence, however, as the idle and surplus bulls do not ordinarily cause much trouble to the harem bulls.

Most of the idle bulls wait for cows in the rear of the rookery and usually have small harems before the season is over. The surplus bulls on the hauling grounds wander about continuously, looking for stray cows, but they do not, as a rule, put up any serious fight with harem bulls.

Number of harem and idle bulls, approximate ratio of idle bulls to harem bulls, and average harem, 1932

Rookery	Date	Harem bulls	Idle bulls	Total	Approximate ratio of idle bulls to harem bulls	Average harem
St. Paul Island:						
Kitovi	July 18	353	69	422	1:5	36.29
Lukanin	do	145	39	184	1:4	42.72
Gorbatch	July 15	711	132	843	1:5	45.75
Ardiguen	do	70	13	83	1:5	43.96
Reef	do	1,337	336	1,673	1:4	48.87
Sivutch (estimated)		400	85	485	1:5	49.99
Lagoon (actual count)	July 19	5	1	6	1:5	22.00
Tolstoi	July 18	939	237	1,176	1:4	40.96
Zapadni	July 19	759	181	940	1:4	48.70
Little Zapadni	do	433	96	529	1:5	43.52
Zapadni Reef	do	41	10	51	1:4	15.95
Polovina	do	371	89	460	1:4	35.81
Polovina Cliffs	July 16	269	63	332	1:4	27.04
Little Polovina	do	119	19	138	1:6	22.26
Morjovi	July 17	287	79	366	1:4	16.59
Vostochni	do	2,029	491	2,520	1:4	26.12
Total		8,268	1,940	10,208	1:4	38.21
St. George Island:						
North	July 21	653	141	794	1:5	39.48
Staraya Artil	do	459	99	558	1:5	42.32
Zapadni	July 19	149	58	207	1:2	18.40
South	do	95	12	107	1:8	6.77
East Reef	July 22	151	36	187	1:4	39.12
East Cliffs	do	313	63	376	1:5	53.88
Total		1,820	409	2,229	1:4	39.21
Total (both islands)		10,088	2,349	12,437	1:4	38.39

AVERAGE HAREM

The average harem has been determined on a basis of an increase of 8 percent for the cows, and through actual counts or close estimates of the bulls. The average harem for the two islands is 38.39, compared with 38.84 in 1931 and 56.77 in 1927.

The average harem has been constantly decreased during the last few years by leaving a sufficient number of 3-year-old males for breeding requirements. The present average harem may be considered very satisfactory. However, if the cows have been increasing at the same rate as the 3-year-old males, through the leaving of a larger breeding reserve—and there does not seem to be any valid reason to the contrary—then there are actually more cows in the herd than are recorded. In this case, the average harem would be slightly greater than the records indicate. It could not be very much greater, however, as observations show that throughout the entire season there were many surplus bulls roaming around the rookeries and hauling grounds, looking for cows. If there were more cows on hand than could be handled by the harem bulls, these cows would

have worked to the rear of the rookeries, where they would have been seized by the idle and surplus bulls, and additional harems would have been established.

Computation of breeding cows, based on annual increase of 8 percent, and of average harem, in 1932

Rookery	Breeding cows		Harem bulls, 1932	Average harem		
	1931	1932		1932	1931	Increase (+) or decrease (−) in 1932 from 1931
St. Paul Island:						
Kitovi	11,863	12,812	353	36.29	34.49	+1.80
Lukanin	5,735	6,194	145	42.72	44.46	−1.74
Gorbatch	30,120	32,530	711	45.75	51.31	−5.56
Ardiguen	2,849	3,077	70	43.96	26.38	+17.58
Reef	60,501	65,341	1,337	48.87	47.79	+1.08
Sivutch	18,513	19,994	400	49.99	46.87	+3.12
Lagoon (actual count pups)	114	110	5	22.00	28.50	−6.50
Tolstoi	35,616	38,465	939	40.96	42.86	−1.90
Zapadni	34,228	36,966	759	48.70	52.10	−3.40
Little Zapadni	17,447	18,843	433	43.52	42.24	+1.28
Zapadni Reef	606	654	41	15.95	16.38	−.43
Polovina	12,300	13,284	371	35.81	34.84	+.97
Polovina Cliffs	6,735	7,274	269	27.04	25.80	+1.24
Little Polovina	2,453	2,649	119	22.26	22.71	−.45
Morjovi	4,409	4,762	287	16.59	17.29	−.70
Vostochni	49,080	53,006	2,029	26.12	27.13	−1.01
Total	292,569	315,961	8,268	38.21	38.71	−.50
St. George Island:						
North	23,869	25,779	653	39.48	39.85	−.37
Staraya Artil	17,985	19,424	459	42.32	41.54	+.78
Zapadni	2,538	2,741	149	18.40	19.37	−.97
South	595	643	95	6.77	6.54	+.23
East Reef	5,470	5,907	151	39.12	38.79	+.33
East Cliffs	15,616	16,865	313	53.88	55.57	−1.69
Total	66,073	71,359	1,820	39.21	39.42	−.21
Total (both islands)	358,642	387,320	10,088	38.39	38.84	−.45

PUPS AND COWS

The estimated number of cows and pups was determined in the usual manner, by applying an increase of 8 percent to the numbers computed for the previous year.

The percentage of dead pups determined in 1922 was applied as the death rate on each rookery. It is believed that fewer dead pups are found in dry seasons than in wet seasons. When there is much rain, the pups are constantly wet and appear to suffer considerably from the cold for some time after they are born.

It is believed that the cows and pups have been increasing at a rate higher than 8 percent. It is hardly possible that the large increase in the number of 3-year-old males available for killing could be entirely due to lower mortality rates. The large number of surplus males available for breeding purposes at the end of the season would indicate that all late-arriving cows and virgin cows are now being properly served—a condition which did not exist when there was a shortage of breeding bulls.

Distriution of pups on the Pribilof Islands, Aug. 10, 1932, and comparison with distribution in 1931

Rookery	1932				1931	1932
	Living pups	Dead pups	Total pups	Percent dead pups	Total pups	Increase
St. Paul Island:						
Kitovi	12,624	188	12,812	1.47	11,863	949
Lukanin	6,060	134	6,194	2.17	5,735	459
Gorbatch	32,250	280	32,530	.86	30,120	2,410
Ardiguen	3,003	74	3,077	2.39	2,849	228
Reef	64,387	954	65,341	1.46	60,501	4,840
Sivutch	19,506	488	19,994	2.44	18,513	1,481
Lagoon (actual count)	109	1	110	.91	114	−4
Tolstoi	37,930	535	38,465	1.39	35,616	2,849
Zapadni	36,330	636	36,966	1.72	34,228	2,738
Little Zapadni	18,372	471	18,843	2.50	17,447	1,396
Zapadni Reef	649	5	654	.80	606	48
Polovina	13,081	203	13,284	1.53	12,300	984
Polovina Cliffs	7,139	135	7,274	1.85	6,735	539
Little Polovina	2,583	66	2,649	2.51	2,453	196
Morjovi	4,666	96	4,762	2.02	4,409	353
Vostochni	51,903	1,103	53,006	2.08	49,080	3,926
Total	310,592	5,369	315,961	1.70	292,569	23,392
St. George Island:						
North	25,418	361	25,779	1.40	23,869	1,910
Staraya Artil	18,923	501	19,424	2.58	17,985	1,439
Zapadni	2,710	31	2,741	1.12	2,538	203
South	632	11	643	1.72	595	48
East Reef	5,818	89	5,907	1.51	5,470	437
East Cliffs	16,614	251	16,865	1.49	15,616	1,249
Total	70,115	1,244	71,359	1.74	66,073	5,286
Total (both islands)	380,707	6,613	387,320	1.71	358,642	28,678

MORTALITY OF SEALS AT SEA

Very little is known as to the cause of the high mortality rate of seals at sea during the first 3 years of life. The greatest loss probably occurs soon after the pups leave the islands in the late fall. Up to that time the pups have been well cared for by the cows, but upon leaving the islands they must learn to shift for themselves—catch their own food and avoid their natural enemies. During this precarious period of their existence a great many undoubtedly die, especially if food happens to be scarce and enemies abundant. On the other hand, when food is plentiful and there are few natural enemies the mortality rate would be considerably lower. As the fluctuations resulting from such extreme conditions tend to offset each other over a period of years, it is believed that the large increase in the number of 3-year-olds available for killing during recent years was primarily the result of leaving a larger breeding reserve, rather than to any marked decrease in the mortality rate.

COMPLETE COMPUTATION

The following summary shows the methods used for computing the number of animals in the Pribilof Islands fur-seal herd in 1932. The total number of seals of all classes is 1,219,961, or 92,879 more than were in the herd in 1931. This is an increase of 8.24 percent, as compared with an increase of 7.84 percent in 1931 over the preceding year.

Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1932

Class	St. Paul Island	St. George Island	Total
Pups, estimated	315,961	71,359	387,320
Breeding cows, 3 years old and over, by inference	315,961	71,359	387,320
Harem bulls, counted	8,268	1,820	10,088
Idle bulls, counted	1,940	409	2,349
Yearlings, male and female, estimated:			
Females born in 1931	146,285	33,037	179,322
Natural mortality, 40 percent	58,514	13,215	71,729
Yearling females, Aug. 10, 1932	87,771	19,822	107,593
Males born in 1931	146,284	33,036	179,320
Natural mortality, 40 percent	58,514	13,214	71,728
Yearling males, Aug. 10, 1932	87,770	19,822	107,592
2-year-olds, male and female, estimated:			
Yearling females, Aug. 10, 1931	81,272	18,354	99,626
Natural mortality, 15 percent	12,191	2,753	14,944
2-year-old females, Aug. 10, 1932	69,081	15,601	84,682
Yearling males, Aug. 10, 1931	81,259	18,353	99,612
Natural mortality, 17.5 percent	14,221	3,212	17,433
2-year-olds beginning 1932	67,038	15,141	82,179
2-year-olds killed in 1932	920	158	1,078
2-year-old males Aug. 10, 1932	66,118	14,983	81,101
3-year-old males, estimated:			
2-year-old males, Aug. 10, 1931	61,007	13,821	74,828
Natural mortality, 12.5 percent	7,626	1,728	9,354
3-year-old males beginning 1932	53,381	12,093	65,474
3-year-old males killed in 1932	38,113	9,512	47,625
3-year-old males, Aug. 10, 1932	15,268	2,581	17,849
4-year-old males, estimated:			
3-year-old males, Aug. 10, 1931	11,093	2,105	13,198
Natural mortality, 10 percent	1,109	210	1,319
4-year-old males beginning 1932	9,984	1,895	11,879
4-year-old males killed in 1932	411	117	528
4-year-old males, Aug. 10, 1932	9,573	1,778	11,351
5-year-old males, estimated:			
4-year-old males, Aug. 10, 1931	10,912	2,054	12,966
Natural mortality, 10 percent	1,091	205	1,296
5-year-old males beginning 1932	9,821	1,849	11,670
5-year-old males killed in 1932	1	----------	1
5-year-old males, Aug. 10, 1932	9,820	1,849	11,669
6-year-old males, estimated:			
5-year-old males, Aug. 10, 1931	7,924	2,269	10,193
Natural mortality, 20 percent	1,585	454	2,039
6-year-old males, Aug. 10, 1932	6,339	1,815	8,154
Surplus bulls, 7 years old and over, estimated:			
6-year-old males, Aug. 10, 1931	(1)	(1)	6,553
Natural mortality, 20 percent	----------	----------	1,311
7-year-old males, beginning 1932	----------	----------	5,242
7-year-old males killed in 1932	----------	----------	----------
7-year-old males, Aug 10, 1932	----------	----------	5,242
Surplus bulls, Aug. 10, 1931	----------	----------	3,291
Natural mortality, 30 percent	----------	----------	987
Remaining surplus for 1932	----------	----------	2,304

[1] Estimates have been worked out, insofar as possible, to show the approximate number of seals of each class which should be credited to each island. Seals do not, however, haul out in accordance with figures given. Seals born on either island frequent the other island. They travel promiscuously between and haul out on either of the 2 islands. The total for both islands, however, is approximately correct.

Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1932—Con.

Class	St. Paul Island	St. George Island	Total
Surplus bulls, 7 years old and over—Continued			
Breeding bulls of 1931	9,076	2,045	11,121
Natural mortality, 30 percent	2,723	614	3,337
1931 bulls remaining 1932	6,353	1,431	7,784
Breeding bulls 1932	10,208	2,229	12,437
1931 bulls remaining deducted	6,353	1,431	7,784
Increment of new bulls in 1932	3,855	798	4,653
7-year-old males computed for 1932			5,242
Surplus bulls computed for 1932			2,304
Total theoretical bull stock for 1932			7,546
New increment of breeding bulls deducted			4,653
Surplus bulls, Aug. 10, 1932			2,893

RECAPITULATION

Class	Total	Class	Total
Pups	387,320	5-year-old males	11,669
Cows	387,320	6-year-old males	8,154
Harem bulls	10,088	Surplus bulls	2,893
Idle bulls	2,349		
Yearling females	107,593	Total, 1932	1,219,961
Yearling males	107,592	Total, 1931	1,127,082
2-year-old females	84,682		
2-year-old males	81,101	Numerical increase, 1932	92,879
3-year-old males	17,849	Percent increase, 1932	8.24
4-year-old males	11,351		

PROGRESS IN BIOLOGICAL INQUIRIES, 1932[1]

By Elmer Higgins, *Chief, Division of Scientific Inquiry*

[With the collaboration of investigators]

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[1] Appendix II to the Report of the U.S. Commissioner of Fisheries for 1933. Approved for publication Apr. 11, 1933.

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INTRODUCTION

Performing the original functions assigned by Congress in 1871 to the old United States Fish Commission, the technical staff of the Division of Scientific Inquiry pursued during 1932 the orderly program of fishery research developed during the past 5 years for the purpose of determining changes in abundance of the food and game fishes of our sea coasts and interior waters, of recommending measures of conservation for the proper protection and utilization of the supply, and of encouraging the farming of aquatic products.

The major scientific projects that have been continued are included in three fields: Marine and fresh water commercial fishery investigations, investigations pertaining to game fishes, and shellfishery investigations. As may be expected from the systematic pursuit of a well-organized research program, progress has been made in the solution of the problems affecting the fisheries in all these fields. It is difficult to select outstanding accomplishments in projects which require many years for completion and which by their very nature develop slowly. Nevertheless, a few may be cited.

From the investigations of the haddock fisheries off the New England coast it is becoming increasingly evident that success or failure of the great trawl fishery, employing nearly 100 of the largest vessels in the fishing fleet, depends upon success or failure of spawning and survival of the young and not directly upon the numbers of spawning adult haddock. The decline of the haddock fishery from its maximum in 1929 to a minimum in 1932 is thus attributed to failure of reproduction in the years from 1926–28. Improvement in the yield is anticipated because of the relatively successful spawning year of 1929 which produced more young haddock than any year since 1924.

Similar censuses of the mackerel population are providing the basis of increasingly accurate predictions in yield of that fishery, and the study of spawning success and survival in the salmon fisheries in Alaska not only provide the basis for the Bureau's regulations of those important fisheries but also yield predictions of future yields that are accepted by the industry in planning fishing and canning operations.

For the first time the mystery which has shrouded the life history and habits of the shrimp on the South Atlantic and Gulf coasts is yielding to scientific research. Although the investigation started as recently as 1931, the extreme vulnerability of the shrimp supply to overfishing has been demonstrated. Because of the fact discovered during the year that the important commercial species have a life cycle limited to about 1 year, warning has been issued to the States that the fisheries should be diligently observed for first signs of depletion, which when it appears will almost certainly run a tragically rapid course resulting in disaster for this extensive industry. The major

features of the life history of the shrimp have been sketched as a basis for wise conservation measures when they are needed.

The oyster investigations of the Bureau have been so designed as to give direct and practical aid to the industry. Experimental and demonstration farms have been established in a number of localities throughout the South Atlantic and Gulf Coast States. More economical and practical methods of opening oysters, which also improve their quality, have been devised, and the Atlantic coast growers have been warned of the dangers to the native stock of the importation of Japanese oysters. These warnings have been heeded, and in some States legislation has been passed prohibiting the planting of the Japanese variety in waters along the Atlantic coast. On the Pacific coast aid has been given to the growers cultivating native Olympia oysters.

During the past few years the Bureau's investigations in aquiculture have been successful in improving hatchery technique, combating disease which annually has taken heavy toll of trout and other game fishes crowded under unnatural conditions in hatchery troughs, and in improving strains of brood fish that are more productive and more disease resistant than wild stock. Continued improvements have been made during the past year in developing diets that will produce growth, vigor, and color in hatchery-reared fish equal or superior to those found in nature. At the same time material economies in operation have been effected by the use of cheaper food materials.

Additional improvements in the restocking of inland waters are resulting from the Bureau's program of stream survey. The extension of highway travel and the rapid increase in the number of anglers have necessitated radical changes in the methods of planting and have demonstrated the necessity for systematic stocking based upon accurate knowledge of conditions of fish life existing in the more accessible lakes and streams. Since the Bureau's responsibility for maintaining and improving angling is definitely indicated in the waters of the public domain, limnological investigations have been concentrated in the national parks and forests in the intermountain region and will be extended to other areas as funds and personnel permit. Studies already made under this program are yielding results in systematic stocking of public waters that will be increasingly apparent to the angler from year to year.

Although funds authorized to be appropriated by the act of May 21, 1930, known as the "Five-Year Construction and Maintenance Program of the U.S. Bureau of Fisheries", have not been provided, the major projects of investigations under way during 1931 were continued. The reduction of appropriations for scientific work which became available July 1, 1932, amounting to more than one-third of the total appropriation, necessitated considerable curtailment of activities in each of the major programs of investigation, and the entire abandonment of several minor undertakings. The steady increase of funds for fishery investigations during the past several years has permitted the gradual expansion of activities and increase in technical personnel. Because of the difficulties in securing well-trained fishery biologists, however, appointments to the permanent staff lagged behind authorized pay rolls and resulted in the employment of a larger number of temporary and part-time assistants than normally would be the case. Hence, the curtailment of funds has resulted first in the discontinuance of virtually all temporary appointments

without seriously reducing the permanent staff. Under the enlarged program of 1931, a great mass of field observations have been collected which during the past year have been subjected to analysis and laboratory study so that reduced expenditure for travel, equipment, and the usual expenses of investigations has not seriously affected the efficiency of the research activities nor materially curtailed the scientific output.

As in former years the Division of Scientific Inquiry participated in the work of the North American Council on Fishery Investigations—an international scientific advisory body composed of representatives from Canada, Newfoundland, France, and the United States, all of which are directly interested in the fisheries of the North Atlantic area. The nineteenth meeting of the council was held in Washington D.C., on October 20 and 21, which a number of the Division's investigators attended in addition to the regular membership of the council.

In previous reports mention has been made of extensive cooperation in fishery research by States and other institutions. Such cooperation has been continued in a gratifying degree during the past year. Not only has official support and encouragement in projects been accorded by the States, but also active participation either by the furnishing of considerable funds or by coordinated activity on the part of the research staffs of the individual State fish and game commissions has been provided to such an extent that activities of the Bureau's staff have been more effective than would have been the case otherwise. Such cooperation which is gratefully acknowledged by the Bureau is in most cases mentioned in connection with the various investigations in the following pages.

PUBLICATIONS

Owing to the curtailed funds for printing the number of publications resulting from investigations of the staff or conducted under supervision of the Division has been reduced. Nevertheless, 12 reports were issued by the Bureau and 34 were printed under private auspices in publications outside of the Bureau of Fisheries. The list of papers published by the Bureau follows:

Fish, Marie Poland.
Contributions to the Early Life Histories of Sixty-two Species of Fishes from Lake Erie and its Tributary Waters. Bulletin, vol. XLVII, pp. 293–398, 144 figs. Bulletin No. 10.

Galtsoff, Paul S.
Introduction of Japanese Oysters into the United States. Fishery Circular No. 12, 16 pp., 4 figs.

Higgins, Elmer.
Progress in Biological Inquiries, 1931. Appendix III, Report, Commissioner of Fisheries, 1932, pp. 441–529.

Hopkins, A. E.
Sensory stimulation of the Oyster, *Ostrea virginica*, by Chemicals. Bulletin, vol. XLVII, pp. 249–261, 11 figs. Bulletin No. 8.

Juday, C., Willis H. Rich, G. I. Kemmerer, and Albert Mann.
Limnological Studies of Karluk Lake, Alaska, 1926–1930. Bulletin, vol. XLVII, pp. 407–436, 6 figs. Bulletin No. 12.

Koehring, V., and H. F. Prytherch.
New Methods of Opening Oysters and Improving their Condition for Market. Investigational Report No. 15, 25 pp., 11 figs.

Pearson, John C.
Winter Trawl Fishery Off the Virginia and North Carolina Coasts. Investigational Report No. 10, 31 pp., 12 figs.

RICH, WILLIS H.
Salmon-tagging Experiments in Alaska, 1930. Bulletin, vol. XLVII, pp. 399–406, 1 fig. Bulletin No. 11.
RICH, WILLIS H., and EDWARD M. BALL.
Statistical Review of the Alaska Salmon Fisheries, part 3: Prince William Sound, Copper River, and Bering River. Bulletin, vol. XLVII, pp. 187–247, 10 figs. Bulletin No. 7.
ROUNSEFELL, GEORGE A., and EDWIN H. DAHLGREN.
Fluctuations in the supply of herring, *Clupea pallasii*, in Prince William Sound, Alaska. Bulletin, vol. XLVII, pp. 263–291, 15 figs. Bulletin No. 9.
SETTE, OSCAR E.
Outlook for the Mackerel Fishery in 1932. Fishery Circular No. 10, 25 pp., 6 figs.
SURBER, EUGENE W.
Controlling Vegetation in Fish Ponds with Sodium Arsenite. Investigational Report No. 11, 39 pp., 23 figs.

The following papers were published by members of the staff of the Division of Scientific Inquiry during the year 1932 outside of the Bureau of Fisheries' series:

DAVIS, H. S.
The Influence of Heredity on the Spawning Season of Trout. Transactions, American Fisheries Society, vol. 61, pp. 43–46.
DEASON, HILARY J.
Scientific Investigation of Chubnet Fishing in Lake Michigan. The Fisherman, vol. 1, no. 4, pp. 3–4, 11–12, March 1932.
FIRTH, FRANK E.
Phenominal Development in the Southern Trawl Fishery. Fishing Gazette, vol. 49, no. 12, pp. 6–7.
GALTSOFF, P. S.
The Life in the Ocean from a Bio-chemical Point of View. Journal, Washington Academy of Science, vol. 22, no. 9, pp. 246–257.
Spawning Reactions of Three Species of Oysters. Journal, Washington Academy of Science, vol. 22, no. 3, pp. 65–69.
The Coral Reefs of the Hawaiian Islands. The Collecting Net, vol. VII, no. 2, pp. 29–30.
GALTSOFF, P. S., and R. O. SMITH.
Stimulation of Spawning and Crossfertilization between American and Japanese Oysters. Science, vol. 76, pp. 371–372.
GINSBURG, ISAAC.
A Revision of the Genus Gobionellus (Family Gobiidæ). Bulletin, Bingham Oceanographic Foundation, vol. 4, art. 2, 51 pp., 7 figs., March 1932.
HERRINGTON, WM. C.
The Haddock Catch, What is Happening to It? Fishing, vol. XII, no. 8, pp. 4–5.
An Otter-Trawl Development for Saving Small Fish. Fishing Gazette, vol. 49, no. 4, pp. 8–11, 20.
HERRINGTON, WM. C., and D. MERRIMAN.
The Advantages of the New Savings Trawl. Fishing Gazette, vol. 49, no. 10, pp. 8–10.
HIGGINS, ELMER.
Lobster Conservation Demands Protection for the Big Egg-Producers. Fishing, vol. XII, no. 1, January 1932, p. 18.
Fishery Research by the Federal Government. The Collecting Net, July 2, 1932, vol. VII, no. 2, pp. 29–32.
Federal and State Investigation of the Shrimp Progresses. Louisiana Conservation Review, vol. II, no. 11, pp. 30–33, October 1932.
HILDEBRAND, SAMUEL F.
On a New Cyprinoid from South Dakota. Journal, Washington Academy of Science, vol. 22, no. 9, pp. 258–260, 1 fig.
On a Collection of Fishes from the Tuckaseegee and upper Catawba River Basins, N.C., with a Description of a New Darter. Journal, Elisha Mitchell Scientific Society, vol. 48, no. 1, pp. 50–82, 2 figs., 1 plate.
Growth of Diamond-back Terrapins, Size Attained, Sex Ratio, and Longevity. Zoologica, vol. IX, no. 15, pp. 551–568, 2 plates.

HILE, RALPH.
Fish Scales and Commercial Fisheries. The Fisherman, vol. 1, no. 10, pp. 3–4, 10, September 1932.
HOPKINS, A. E.
Chemical Stimulation by Salts in the Oyster. Journal, Experimental Zoology, vol. 61, pp. 13–28.
JOBES, FRANK W.
Deep Trapnets on Lakes Huron and Michigan. The Fisherman, vol. 1, no. 3, pp. 3–4, February 1932.
MCMILLIN, H. C. and P. BONNOT.
Oyster Pests in California. California Fish and Game, vol. 18, pp. 147–148.
NEEDHAM, P. R.
Distribution of Bottom Foods in Trout Streams. Field and Stream, February 1932.
Giving Anglers Real Sport. American Game, May–June 1932.
SURBER E. W.
Sodium Arsenite for Controlling Submerged Vegetation in Fish Ponds. Transactions, American Fisheries Society, vol. 61, pp. 143–147.
SURBER, E. W., and O. L. MEEHEAN.
Lethal Concentrations of Arsenic for Certain Aquatic Organisms. Transactions, American Fisheries Society, vol. 61, pp. 225–239.
VAN OOSTEN, JOHN.
The Maximum Age of Fresh-water Fishes. The Fisherman, vol. 1, no. 11, pp. 3–4, October 1932.
Experiments on the Mesh of Trapnets on Lake Erie. The Fisherman, vol. 1, no. 12, pp. 3–4, 8, November 1932.
Review of Great Lakes Work Conducted by the U.S. Bureau of Fisheries. The Fisherman, vol. 2, no. 1, pp. 3–4, 8, December 1932.
WEYMOUTH, F. W.
Federal and State Cooperative Shrimp Investigation in Louisiana. Louisiana Conservation Review, vol. 2, no. 9, pp. 39–40. June 1932.
WIEBE, A. H.
Notes on the Exposure of Several Species of Fish to Sudden Changes in the Hydrogen-ion Concentration of the Water and to an Atmosphere of Pure Oxygen. Transactions, American Fisheries Society, vol. 61, pp. 216–222.
WIEBE, A. H., E. G. Gross, and D. H. Slaughter.
The Arsenic Content of Large-mouth Black Bass (*Micropterus salmoides* Lacepede) Fingerlings. Transactions, American Fisheries Society, vol. 61, pp. 150–160.
WRIGHT, STILLMAN.
Pollution in Western Lake Erie. The Fisherman, vol. 1, no. 6, pp. 3–4, 10, May 1932.
Plankton and The Fisheries. The Fisherman, vol. 1, no. 7, pp. 3–4, 11, June 1932.
Conditions of Life in Lakes. The Fisherman, vol. 1, no. 8, pp. 3–4, 12, July 1932.

The following progress reports covering the more important investigations of the Division during the calendar year 1932 were prepared in the main by the investigators in charge of the various projects.

NORTH AND MIDDLE ATLANTIC FISHERY INVESTIGATIONS

Investigations of fisheries of the Atlantic coast from Maine to Virginia continued in 1932 to be concentrated on scientific research needed to arrive at means of insuring the continued productivity of the fisheries based on the more important food fishes: Haddock, cod, flounder, mackerel, squeteague, scup, and butterfish. Decreased funds necessitated curtailment of activities in all phases of the work but more especially in the cod and flounder studies and the offshore work of the haddock and mackerel studies involving use of the fisheries research ship *Albatross II*, the latter being out of service after June 30 for lack of operating funds.

As in previous years, the staff, under the direction of O. E. Sette, was headquartered in Cambridge, Mass., where the biological laboratories and the Museum of Comparative Zoology of Harvard University have kindly provided laboratory and library facilities to the Bureau. This arrangement has had the advantage of not only providing for the physical needs of this group, but facilitated consultation with members of the various departments when special advice was needed for particular phases of the work. Especially profitable has been the ever available counsel of Dr. Henry B. Bigelow, professor of oceanography at Harvard University and Director of the Woods Hole Oceanographic Institution. The latter institution also provided valuable aid in detailing its research vessel *Atlantis* to two cruises in the interests of the mackerel investigations. The cooperation of Prof. A. E. Parr, curator of the Bingham Oceanographic Foundation at Yale University, in continuing his studies of the early life histories of fishes along the coast of New Jersey has provided results vital to the understanding of the natural economy of the commercial species of the Middle Atlantic region. The Montauk Yacht Club in providing dock facilities for live cars contributed to the success of a squeteague tagging project. The kindness of fishermen in providing the Bureau with records of their fishing operations; of fishing companies in putting their business records of fish receipts at the disposal of our staff; and of fishing captains in accomodating field observers aboard their vessels for the purpose of tagging fish and collecting biological data, have also greatly facilitated the work.

HADDOCK

The New England haddock fishery has, during the past few years, experienced decided changes in productivity, the total landings at the principal ports in this region having increased from about 70,000,000 pounds in 1921 to more than 240,000,000 pounds in 1929. From that peak the landings declined to about 137,000,000 pounds in 1932. These changes have been due to a multiplicity of causes the understanding of which is essential to any intelligent consideration of the fishery and its future. The attainment of this understanding is one of the primary objectives of the Bureau investigations begun in the fall of 1930.

The program of investigation briefly outlined in the annual report for 1930 has been continued during 1932 under the direction of William C. Herrington. Although the work was considerably curtailed owing to reduced funds, it was possible to continue the most fundamental observations during the past year.

Haddock population studies; biology and statistics.—Statistics from the fishing fleet have been collected by F. L. Widerstrom and A. A. Dallas throughout the year at the Boston Fish Pier and at sea. The Fish Pier collections included the records of the position and amount of fishing done for each trip landed, data on the size, age, and growth of the fish caught on each bank, etc. In addition, 20 field trips were made on commercial trawlers primarily to secure information on the abundance of the smaller size classes not landed. By using this material combined with the detailed information from the fleet operating records furnished by several of the major fishing companies, there has been assembled a practically complete record for all the offshore fishing activities of the New England ground-fish fleet.

The analysis of material on the relative abundance and distribution of the haddock population, handled principally by J. R. Webster, has shown that from many aspects the year 1932 has been the most interesting in the recent history of the New England haddock fishery. Following a continuous decrease since 1927 in the stock of haddock of commercial size (total abundance of haddock was greatest in 1927 although the greatest landings were in 1929 due to increased fishing effort), the winter of 1931–32 and summer of 1932 finally witnessed an increase in the abundance of marketable fish. Observations on the statistical and biological mechanics of this increase have provided some of the most important of our results for the past year both in respect to increasing our understanding of fluctuations of the fishery in the past and in more definitely determining a basis for our future expectations.

The bulk of the New England haddock landings during the past few years have come from Georges Bank (including South Channel and Nantucket Shoals). In 1932 this area accounted for about three quarters of the total New England catch. The principal efforts of the present investigation have consequently been concentrated in this region.

The annual report for 1931 considered the relatively poor condition of the fishery on Georges Bank during that year due primarily to intensive fishing combined with the failure of the reproductive cycle to produce any considerable number of young haddock over a period of several years (probably 4 or 5). Field observations during the fall of 1930 and during 1931 had shown that a group of young fish had finally appeared in considerable numbers and had reached a sufficient size in the fall of 1931 so that the larger ones were of commercial value. During the fall and early winter of 1931 the catch of large haddock continued to decline but the catch of scrod increased about 19 times over the same period of the previous year. At that time, however, we had few data to indicate how much this group of young fish would influence the catch during the next few years.

In 1932 the extensive population of young fish on Georges Bank increased in average size through growth from about 41 to 42 centimeters (1.5 pounds) to 47 to 48 centimeters (2.2 to 2.5 pounds). As a result during the summer of 1932 practically the entire group had reached scrod size and toward the latter part of the year a considerable part of them were sufficiently large to be sold as market haddock. Consequently, the catch per unit of fishing time, during the summer of 1932, experienced a sharp increase to the highest level since 1929 and averaged for the entire year about 35 to 40 percent better than during 1931 (though not approaching the record year of 1927).

The course of the fishery on Georges Bank during 1933 will depend on the effect of the abundant group of young haddock which have come into the commercial fishery during 1932. Length-frequency measurements indicate that very nearly all of this year class were of scrod size by the spring and summer of 1932. Since that time, no new group of young haddock has appeared which will affect the commercial fishery on Georges before the winter or late fall of 1933. Consequently, the only conclusion to be reached is that unless new conditions develop which differ markedly from those experienced during the past 2 years, the catch per day, all sizes considered, will not be appreciably better in 1933 than in 1932, and probably it will

be considerably less due to the mortality suffered by the population since 1932. Growth in average weight of the fish will partly compensate for the mortality but probably not sufficiently to maintain the catch at the 1932 level.

Data collected on trawlers at sea have shown that the 1930 spawning on Georges Bank was practically a failure; therefore, the next recruitment to the commercial fishery cannot take place until the 1931 year class reaches commercial size. This should be in the fall and winter of 1933–34. Haddock of this class are now taken, sometimes in considerable numbers, on southeastern Georges and some on the Northern Edge, but they do not appear to be as abundant as was the 1929 class at the same age. It will not be possible, however, to obtain any adequate measure of their importance until they become large enough to be brought into market with the commercial catch. No adequate measure of the abundance of the fish smaller than market size is possible until a vessel is available for periodic surveys of the young-fish population.

On the banks east of the Fundian Channel such as Browns, LaHave and Western, the picture is considerably different. The scrod catch from this area during the past year has been very low, but haddock too small to be marketed have at times been taken in great numbers. These small fish were just beginning to be brought in with the commercial catch in November and December 1932, as was shown by length-frequency measurements, and by a slight increase in scrod landings for this area. Their continued growth should bring all of them into scrod size during 1933 and 1934, which will help to counterbalance the scarcity of scrod to be expected on Georges Bank in the summer and fall of 1933.

Early life history.—The observations made on early life history in 1932 were limited to one trip on the *Albatross II*, covering the area from west of Nantucket Shoals to Browns Bank. Salinity and temperature records were taken at 51 stations and hauls for eggs and larvae made with 1- and 2-meter ring trawls at each station. Seven hundred drift bottles were also released at the different stations. The analysis of this material is providing extensive information on the distribution and drift of the haddock eggs and larvae, which is essential to any understanding of the extent to which one fishing bank is dependent on another for its supply of young. It may also help to determine the causes of the great variations in the success of different spawning seasons. This work will have to be discontinued in 1933 as the *Albatross II* will not be available.

The analysis of temperature, salinity, and drift bottle records has provided a consistent general picture of the system of currents on Georges Bank for the spring and early summer of 1931 and 1932. The results are substantiated by measurements of currents furnished us by the Coast and Geodetic Survey for 1- to 8-day periods at various points on Georges Bank during 1930 and 1931. Conditions in the spring of 1932, although in general similar to 1931, differed in certain details. It will be of interest to learn whether this change in conditions may have affected the abundance of the year class resulting from the corresponding year's spawning. The evidence on this score will not be available until late in 1933, when the haddock of the 1932 class should reach a sufficient size to be captured by the commercial nets.

No Bureau personnel was available in 1932 for the study of the collections of eggs and larvae. Fortunately, however, we were able to arrange with L. A. Walford for the analysis of the data in conjunction with his research work at Harvard University. The results so far have confirmed the conclusions from our hydrographic studies and help to provide an explanation why the small haddock of the 1931 class have so far been found in abundance only on eastern and southeastern Georges. Haddock of the 1929 class also were first found there in large numbers, apparently spreading as they grew older to the Northern Edge and to the South Channel. The evidence also indicates that there is little or no drift of eggs or larvae across the Fundian Channel either from Georges to Browns Bank or the reverse.

Savings gear.—During January and March 1932, three trips were made on the *Kingfisher* of the Portland Trawling Co. fleet and one on the *Exeter* of the Whitman, Ward, and Lee fleet to obtain data on the action of "savings cod-ends" used commercially on standard nets. The work was under the direction of Messrs. Herrington and D. Merriman, assisted by Messrs. Widerstrom, Dallas, and E. M. Leupold. The gear was satisfactory. It proved as durable as the standard type; fished as effectively; and released a large proportion of the small haddock. The amount of small fish taken, in comparison with a standard cod-end, depended on the average size of the small fish present on the banks. In the case of small haddock 20 to 35 centimeters in length, there was an escapement of 90 and 75 percent; between 35 centimeters and the commercial size of 40 centimeters the escapement was progressively less with practically no loss of haddock above the minimum commercial size.

The results of the work were described briefly in the April issue of Fishing Gazette and recommendations for the "savings gear" were published in the same journal in September. These recommendations consist primarily of an increase in the size of mesh in the net to give a minimum stretched mesh of 4½ inches clear, measured inside of the knots, or 5 to 5¼ inches measured between knot centers, depending on the weight of twine used. Other modifications in the construction of the net were recommended to give it increased strength and to assist in keeping the cod-end meshes open when the net is in operation. Certain other types of construction were found to give somewhat better selective characteristics but were not recommended as it has been considered that simplicity of the gear would facilitate its adoption by the industry.

MACKEREL

Among the leading fisheries of the Atlantic coast, that for mackerel is notable for its extreme fluctuation in yield. For the purpose of ascertaining the causes of such fluctuations and exploring the possibilities of alleviating the periods of scarcity, or of taking full advantage of the years of abundance, investigation of this fishery was begun by O. E. Sette in 1925 and has been continued through the succeeding years. The nature of the fluctuations was such as to indicate that the causes might lie in the variability from year to year in the numbers of young mackerel resulting from spawning. Hence the work was designed to determine the relative success of each spawning season, by observing the proportion of fish of each age in

the catch. This involved sampling the catch throughout the season and estimating the numbers of fish of each year of age in the catch. Since changes in size of the fleet might also be reflected in the annual catch, statistics of the catch of individual vessels have also been compiled since 1925.

In 1932 most of the sampling was done by F. E. Firth at New York during May and June; at Boston from July to October; and at Gloucester in November and December. Additional data were secured at various minor ports from Maine to New Jersey. During the year the mackerel fleet landed 3,802 fares aggregating 46,770,740 pounds. Of these, 2,020 fares representing 29,490,409 pounds were recorded by locality of capture through interviews with captains; 31,352 mackerel were measured from 1,168 fares; and scales were taken from 1,954 mackerel.

The age composition of the mackerel population, as derived from these data in 1932 and the previous 6 years, confirms the original supposition that variability from year to year in production or survival of young mackerel is the cause of the major fluctuations in the catch. In every instance during the 7-year period an increase in catch has followed a production of a large year class one or two seasons previous, and each decline was preceded by a season or two in which subnormal numbers of mackerel were produced.

Knowing the mechanics of these fluctuations, it remains to devise means of combatting their ill effects. At least three possibilities are apparent: (1) Adjustment to the fluctuations through prediction of future abundance, (2) lessening of the fluctuations by adjusting the fishing intensity so that successful year classes will be spread over enough years to bridge over the periods of subnormal production of young fish, and (3) control of the production of young fish.

Realizing the potential value of predictions the Bureau has been accumulating experience along this line during the past 5 years. From an appraisal of the rate of decline of each year class and the likelihood of augmentation by the advent of successful classes, the prospects for each season were estimated in terms of probable catch, and the results made public in fishing trade journals during the first 3 years, and by means of Bureau fishery circulars in the last 2 years. Of the 5 trial forecasts, 1 was noncommittal, 2 were approximately correct, 1 (1930) was too high by 17,000,000 pounds or 28 percent, and 1 (1932) was too low by 11,000,000 pounds or 42 percent. These two instances of disparity between prediction and catch were caused solely by unexpected changes in abundance of mackerel that were 2 years old. In all the years of record the predictions of abundance of mackerel older than this were reasonably fulfilled.

The difficulties of predicting the abundance of 2-year-old mackerel apparently have been brought about by the existence of at least two distinct types of year classes, distinguishable by changes in availability during the first 3 years of existence and by peculiarities of distribution. If this is the case, an accurate prediction would depend on the determination of the type in the yearling stage. From considerations too involved to enter upon in this report, it is believed that morphological studies of each year class, coupled with extensive marking experiments of each year class in the yearling stage, might enable such distinction to be made. Thus, it appears that an improvement in the prediction of 2-year-olds is contingent on provision being made for these two additional phases of st udy.

While improving the accuracy of predictions of the abundance of 2-year olds would rectify the most serious fault of the present forecasting system, there still would remain the question of how to predict the abundance of yearlings. Prior to their appearance in the fishery as yearlings, mackerel are too small to be the object of a commercial fishery; hence this means of appraising their abundance is lacking, and this category has been omitted from the predictions. Since yearlings often provide a large portion of the commercial yield, it would be useful to have them included. The most promising means of arriving at an estimate of their abundance is by annually estimating the numbers of mackerel surviving to the late larval stage. This involves special technique and must be pursued through a number of years to ascertain the relation between abundance of late larvae and the abundance of yearlings a year later.

To provide data on this subject, the Bureau's research ship *Albatross II* has been detailed to surveys of the spawning grounds during such portions of the last five spawning seasons as she could be spared from other duties. The early years were exploratory, to ascertain the time and place of spawning, and to design gear and devise methods that would give reliable measures of the relative abundance of larvae. It was not until the season of 1932 that equipment and methods were developed that could be expected to provide reasonably reliable results. The report on this season's operations may be considered as an outline of the minimum requirements.

From May until July the *Albatross II* was cruising almost continuously, visiting each of some 30 stations at about weekly intervals. As spawning begins first in the more southerly regions and gradually progresses northward, the area of survey was shifted correspondingly. During May the work was mainly at stations in the offing of Virginia, New Jersey, and New York. By June it was extended to southern New England waters. At each station hauls about one-quarter mile in length were made diagonally from below the 30-meter level to the surface. In the early season when larvae were small a 1-meter net with 0.6-millimeter mesh was used; later, when the larvae exceeded 8 millimeters in length, a 2-meter net with 1- to 2-millimeter mesh was also used. Although the *Albatross II* was taken out of service during the latter part of June, because of the lack of operating funds, the season's observations were extended into the latter part of July with the *Atlantis* which was kindly assigned to this work by the Woods Hole Oceanographic Institution. Altogether 239 stations were occupied, at which 372 hauls were made. The larval mackerel from all hauls have been counted and measured, but personnel has not been available for the clerical labor involved in computing the relative abundance at each stage, so that results cannot yet be reported.

A continuation of such surveys during successive years might enable forecasts of abundance of yearlings to be made, but with the withdrawal of the *Albatross II* from active service, this feature of the work must be held in abeyance and the mackerel predictions must continue to contain this element of uncertainty.

The matter of preventing extremes of fluctuations by relieving intensity of fishing effort on the successful classes so that they may continue abundant enough to bridge the gap caused by a series of reproductive failures, is further from attainment than predictions,

but if feasible, should eventually be of far greater effect in stabilizing the fishery. A continuation of the present program of analyzing the catch may provide part of the knowledge necessary for such control but it should be accompanied by tagging experiments to discover how much of the decreased availability between yearling and 2-year-old mackerel of some year classes is caused by fishing strain, and how much to natural morta ity and changes in habits with increasing age. For instance, the 1928 class yielded 29,000,000 yearling fish, but only 10,000,000 fish during the following year when they were 2 years old. Was this because too many yearlings were caught? If so, would protection to yearlings have prevented the decline in catch in the following year? A properly designed marking experiment carried on regularly through enough seasons to establish the usual course of events might indicate the value of such protection. Inasmuch as such a marking program would also be useful in improving predictions, it is important that means be provided for this as soon as possible.

That fluctuations might be smoothed out eventually by controlling young fish production is a remote possibility, its likelihood of attainment cannot be appraised until more is known about the causes of failures. Current scientific opinion is that the phenomenon of poor year classes among marine fishes is due to excessive mortality in the larval stage, but there are no definite data on the subject. The surveys of the *Albatross II* on the mackerel spawning grounds have been designed to throw light on this question as well as to be of aid in predictions as previously mentioned. With the tying up of this ship for want of operating funds, progress has been halted. As an adjunct to the work at sea, laboratory experiments were carried on during the year by Leonard G. Worley to determine the percentage of mackerel eggs that hatch at different temperatures, while rearing of fish larvae under laboratory conditions was undertaken by Louella E. Cable to learn their food requirements.

COD

Studies of the migratory habits of the cod were continued during 1932 by William C. Schroeder, but on a reduced scale owing to reduction in funds available for the purpose.

The principal item in the year's program was the release of 1,489 marked cod along the coast of Maine to learn whether any of the abundant stock of 2- and 3-year-old cod that inhabit the inshore waters of New England move offshore as they grow to larger sizes, thus contributing to the commercially important stocks of large cod on the offshore banks. For this purpose it is necessary that the tags remain with the fish for a number of years. Since the percentage of external tags lost from the fish is sometimes large, the "belly tag", a celluloid strip inserted into the body cavity according to the method developed by R. A. Nesbit, was used in this experiment. Fears that this type of tag might not be detected as regularly as external tags proved groundless, for the 10.7 percent returned during the first 6 months after release about equals the percentage of returns from comparable experiments with external tags.

To provide additional evidence as to the merits of various methods of tagging, last year's spawning stock of cod from the hatchery at Woods Hole was used to determine the comparative durability of

celluloid disk tags attached at different positions on the fish. Unfortunately, only 304 cod were available; 151 were tagged on the caudal peduncle, 153 on the opercle. During the 11 months since release, 5.3 percent of the caudal tags and 8.5 percent of the opercle tags have been returned. While this seems to favor the position on the opercle, the numbers are too few to be decisive.

Returns from previous years' taggings, that came in during 1932, confirm the previous conclusions that the summer stock of Nantucket Shoals migrates to New York and to New Jersey waters for the winter, returning in the spring to spend the summer on the Shoals. There was also a slight scattering from the Shoals toward the north and east, mainly of larger sizes. The cod off the coast of Maine continued to provide local returns chiefly, only a few coming in from distant points and these mostly from the eastward. The newly marked fish with the more permanent tags, however, may modify this when the 2- and 3-year-old fish bearing them grow to larger sizes.

Mr. Schroeder's resignation, in June 1932, to join the staff of the Woods Hole Oceanographic Institution in capacity of business manager, is a serious loss to the cod-investigating program. It is somewhat offset by his kindness in personally undertaking to continue the analysis of returns from experiments under way and to do such further work as may be possible in his new position.

FLOUNDERS

Although shortage of funds prevented further work on the winter flounder (*Pseudopleuronectes americanus*) the tagging experiment of February to April 1931 continued to produce returns during 1932. Of the 4,179 flounders tagged, 141 were returned during 1931 and 64 during 1932. These indicate that the winter spawning population of Waquoit Bay migrates through the sounds in the spring and summer, some going eastward to the Chatham and Nantucket Shoals region and some westward to the Long Island region. In a few instances, surprisingly extensive migrations were indicated: One to the eastward as far as Georges Bank and one to the westward as far as Tuckerton Bay, N.J. Somewhat greater trend toward the west was shown in 1932 than in 1931. In the winter many flounders returned to Waquoit Bay where they were originally tagged.

SHORE FISHES OF THE MIDDLE ATLANTIC STATES

Investigation of the causes of fluctuation in yield of shore fishes off the Middle Atlantic States, begun in 1927, was continued under the direction of R. A. Nesbit, with data being obtained at Woods Hole, Mass.; Montauk, N.Y.; and Wildwood, N.J. Because of reduced appropriations the bases maintained in 1931 at Fire Island, N.Y.; Belford, Long Branch, Deal, Seaside Park, and Beach Haven, N.J., were abandoned in 1932. Observation of the winter-trawl fishery for Middle Atlantic shore species was carried out at Portsmouth, Va.

Squeteague.—This is the most important of the shore fishes of this region. The average annual catch along the Atlantic coast is more than 30,000,000 pounds with a value of more than $1,000,000. Of this total nearly one half is ordinarily taken in the Middle Atlantic States. In addition to its commercial importance, the squeteague is

highly prized by sportsmen and contributes largely to the recreational value of the shore line of these States.

Fluctuations in yield appear to be caused by variations in the numbers of young fish added to the stock each year, for two cases of increased abundance caused by unusually large increments of 2-year-old squeteague have been noted during the course of the investigation. In 1928 the stock of squeteague in southern New Jersey was augmented by the appearance of large numbers of fish of the 1926 brood. In 1929, 1930, and 1931 these fish returned to the same locality in considerable numbers, accounting for a larger proportion of the catch than any other year class during these years. By 1932 the numbers of fish of this brood had greatly decreased, and since no other brood of comparable magnitude entered the fishery meanwhile, the yield for that year declined. Similarly, in 1929, a large brood of 2-year-old squeteague appeared near Montauk, N.Y., with a corresponding increase in the catch. This brood dominated the fishery in 1929, 1930, and 1931, but by 1932 few returned, and the catch reverted to levels as low as in 1928.

In addition to these two conspicuously large broods, appearing first as 2-year-olds, minor contingents of yearling fish have appeared in southern New Jersey in all the years covered by the investigation, and near Montauk, N.Y., in 1932. These fish are remarkable in that while still yearlings they are always approximately as large as the 2-year-old fish of the dominant year classes described above. Moreover, growth increments of these fish in their first season, as calculated from the scales, are greater than the corresponding increments for the dominant 2-year-olds.

Thus there appear to be two distinct types of young fish entering the fishery in variable numbers from year to year. The first type consists of slow-growing 2-year-olds which occasionally appear in large numbers. The second consists of fast-growing yearlings which have not appeared in sufficiently large numbers during the course of the investigation to affect the yield greatly.

The rate of growth of the 2-year-olds as calculated from the scales agrees closely with the observed rate of growth of young fish during their first two seasons in Virginia and North Carolina. Moreover, slow-growing yearlings are abundant in these States, in marked contrast to their virtually complete absence north of Delaware Bay. Thus, there is much to suggest that the most important increments to the New Jersey and New York stocks of squeteague during the period 1928–32 consisted of fish which had spent their first two growing seasons south of Delaware Bay.

This hypothesis is supported by the results obtained by Prof. A. E. Parr, curator of the Bingham Oceanographic Foundation, who continued his studies of spawning and nursery areas of southern and central New Jersey and at Woods Hole, Mass. As in the preceding years, squeteague eggs were taken in abundance, but larvae were not found in New Jersey waters. This persistent absence of squeteague larvae, in marked contrast to their abundance in lower Chesapeake Bay, suggests the possibility that the eggs fail to hatch in the waters of New Jersey. It has been noted that the eggs are produced in the two localities simultaneously but at a time when water is colder in Delaware Bay than in Chesapeake Bay. It is planned to carry out

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experiments to determine whether squeteague eggs are capable of hatching at the temperatures usually prevailing in Delaware Bay during the spawning season.

It has proved difficult to test the view that northern stocks of squeteague are largely recruited by migration of 2-year-olds from the South, by tagging squeteague in southern waters. The species is so soft-fleshed and so weak-boned that external tags are not retained in adequate numbers for longer than a few weeks. In 1930 Mr. Nesbit devised a new method of tagging which was first used successfully with squeteague in 1931. This consists of inserting a strip of colored celluloid into the body cavity of the fish through a small incision in the body wall. Each strip bears a notice of reward, a return address, and an identifying number.

Of approximately 900 slow-growing yearling squeteague tagged in this manner by W. C. Schroeder in Chesapeake Bay in 1931, 18 were recaptured in 1932. None was retaken north of Delaware Bay. However, since the New Jersey and New York catches in 1932 included very few slow-growing, 2-year-old fish, the hypothesis cannot yet be regarded as disproved, for the origin of these sporadic incursions can be determined only in the years in which they occur. In a further attempt to test this hypothesis, approximately 1,900 squeteague were tagged in the same manner in October 1932 in Pamlico Sound, N.C.

In order to determine whether the minor increments of yearlings to the New Jersey and New York stocks are derived from the juveniles observed each autumn in northern New Jersey and New York, approximately 1,900 juveniles were tagged in October 1932 near Montauk, N.Y.

Should the results of tagging experiments eventually justify the view that many or most of the squeteague taken in New York and New Jersey are immigrants from the South, it will be desirable to estimate the relative contributions of the southern and of the local nursery areas. The differences in rate of growth are sufficient to make this possible if the growth increments of the earlier years can be calculated accurately from the position of the year rings in the scales. Such calculations can be made only if the relation of scale growth to the growth of the body be understood thoroughly. Earlier observations of this relation were checked by a number of experiments at the Woods Hole laboratory of the Bureau, and at the laboratory of the Woods Hole Oceanographic Institution, and were found to be correct. Thus, there has been established a sound basis for separating the two types of increment to the squeteague stocks of the region, not only in the year in which they first appear but in subsequent years as well.

Scup.—In the annual report for 1931, it was shown that although the yield of scup in the summer pound-net fishery has been subject to wide fluctuations, this species has demonstrated its ability to recover naturally from low levels of abundance. The pound-net catch of New Jersey rose by the influx of successful broods from one of the lowest on record in 1928 (316,000 pounds) to a new high level of 4,100,000 pounds in 1931. According to preliminary statistics, the yield of 1932 was only moderately less than the record catch of 1931. These higher yields represent actual increases in abundance, for there was no corresponding increase in intensity of fishing.

Prior to 1929 the scup was generally considered a "summer fish" and constituted an important product of the summer pound-net, trap, and seine fisheries along the Atlantic inshore waters from the Chesapeake Bay to Cape Cod. However, with the rapid growth of a winter-trawl fishery[2] off the Virginia Capes since the winter of 1929, an additional strain has been placed on the species, and the question has been raised whether or not it can withstand the year-round exploitation to which it is now subject. Compilation and analysis of the data bearing on this question were carried out by W. C. Neville.

It was first necessary to determine whether the winter trawlers and the summer pound-net, seine, and trawl fisheries were drawing on the same stock of scup. Marking experiments have disclosed a migration of scup in the fall from the summer fishing ground to the winter fishing ground, and a spring migration from the winter grounds off Virginia to the summer area along New Jersey. Comparison of the size and age composition of the catches of the summer and winter fisheries disclosed that broods of scup that have contributed largely to either the New Jersey, inshore, summer, pound-net fishery or to the more offshore summer-trawl and seine fisheries have also been prominent in the catches made by the trawl fishery in the following winters. Thus, both fisheries appear to be drawing on the same population.

In order to determine whether the double strain on the stock was affecting the yield in one or the other, or both of the fisheries, an analysis was made of the changes in their yields. As indicated in the first part of this report, the summer fishery gives no indication of a decline in abundance to date, and this in spite of the fact that the winter-trawl fishery of 1931–32 drew upon the same age groups.

The total quantity of scup landed at Virginia ports by the winter trawlers increased from approximately 1,600,000 pounds in 1930–31 to approximately 2,200,000 pounds in 1931–32. This increase, however, was caused entirely by increased fishing effort. Actually, there was a decrease in availability, for the catch per trip declined from 7,900 pounds in 1930–31 to 2,800 pounds in 1931–32. It might appear that this decline in the catch per trip, and the shift to smaller sizes in the composition of the catch of the winter-trawl fishery, was perhaps the first indication of depletion from overfishing; but this is not necessarily true for other factors were responsible for these changes. These are: (1) In the winter of 1931–32, scup were probably much less readily available as a result of the schools scattering widely over a larger expanse of coastal sea bottom; this because the bottom water remained warm over a much larger area of the coastal plain in that winter than in the preceding winter.[3] (2) The change in the hydrography of the region resulted in the greater availability of other important food fishes, especially of sea bass, and probably caused a diversion of fishing effort from scup to the more readily caught sea bass. These conditions appear adequate to explain the decline in the catch of scup per trip at sea in 1931–32.

If the number of returns of tagged fish is indicative of fishing intensity, there is little evidence that the scup fishery is being sub-

[2] An account of this fishery is given in Winter-trawl Fishery off the Virginia and North Carolina Coasts, by John C. Pearson. Investigational Report No. 10, Bureau of Fisheries, 1932.

[3] For a description of the changes in the hydrographic conditions between the winters of 1930–31 and 1931–32, see Temperature and the Southern Trawler by William C. Neville, Fishing, January 1933.

jected to any great strain. To date there have been only about 1 percent returns from a total of 5,228 tagged scup. This low percentage cannot be attributed wholly to the loss of tags by becoming detached or to the death of the fish as a result of the marking operation, since returns were well distributed over a period of almost a year. Moreover, in laboratory tests it has been found that tagging causes very little mortality, and that virtually all scup retain the external celluloid disk tags for a period of 4 months, and the majority for at least 1 year. But in order to eliminate any uncertainty due to a possible loss of tags, we may confine our consideration to the returns for the first 4 months after tagging. During such periods, less than 1 percent of the marked scup were returned. This is exceedingly low in comparison with returns of 4 to 20 percent obtained during comparable periods with squeteague, cod, and striped bass, and may be taken to indicate that the fishery at present is catching only a very small part of the general stock of scup in the sea.

It appears, therefore, that although now subject to year-round exploitation, the scup fishery has not to date shown any indication of an appreciable decline in abundance directly attributable to the additional strain. Consequently, there appears to be no present need for restriction of the fishery.

It is important, however, that observation be continued, for this conclusion is based on present conditions of abundance and fishing intensity; and experience has shown that both are subject to rapid change. Each year since 1929 has seen a greater number of trawlers engaged in the winter and summer fisheries, and there is no indication that this increased strain has reached its maximum. The history of the fishery suggests that the yield must eventually decline from present levels, and when this occurs the Bureau should be in a position to judge whether the decline is natural or whether it is due to overfishing, and to make new recommendations to fit the new conditions. This can be done only if observations of abundance, age composition, fishery intensity, and hydrography are continued.

Butterfish.—Continuation of butterfish studies by H. M. Bearse in 1932 has confirmed the view that fluctuations in yield of this fishery are caused primarily by dominant year classes, and that no depletion by overfishing has taken place. Appearance of another large year class in 1932 indicates that a continuation of good yields is to be expected in the immediate future.

CHESAPEAKE BAY INVESTIGATIONS

The studies of the life history of the striped bass or rockfish (*Roccus lineatus*) begun by John C. Pearson in 1931 were continued until June 30, 1932, when curtailment of appropriations forced abandonment of this activity.

Of three hundred and four 2-year-old striped bass tagged during July and August 1931 off Annapolis, Md., a total of 81 fish or 26½ percent were retaken by anglers and commercial fishermen within the first year after release. Most of the recaptured fish were secured north of Annapolis, in the upper bay and tributaries, during the fall and winter following release. In the spring of 1932, however, several recoveries as far south as the upper Potomac and Wicomico Rivers indicated a dispersion of striped bass throughout the upper half of

the bay from the deeper channels which form the wintering grounds of the species. No recoveries have been reported since the spring season.

Observations in upper Chesapeake Bay showed that the striped bass spawn in the Susquehanna River, above Havre de Grace, during the latter part of May. The large and rather delicate eggs of the species were taken in abundance by townets in the Susquehanna and supplied the first evidence on record concerning a natural spawning area of the striped bass.

EXPERIMENTAL REARING OF MARINE FISH LARVAE

The cause of fluctuation in commercial fisheries has been traced to a corresponding fluctuation in the survival of the young of the various species. To determine the physical and chemical factors effecting their survival, Louella E. Cable continued experiments on rearing marine fish larvae at the Woods Hole station during the summer of 1932.

It was shown that the most critical period of development comes a few days after hatching, when the yolk sac is nearly or wholly absorbed and the young fish are ready to take food. Very few larvae feed in the laboratory in standing water, and those that do seldom survive the critical period. Apparently stimulus is needed to make them sufficiently alert to catch food and keep them active after feeding and to create the need and desire for more food for after feeding they sink to the bottom making little effort to swim about. The current rotor devised by Dr. P. S. Galtsoff and Miss Cable while allowing for a constant change of water without danger of loss or injury to the larvae, provides a gentle current which buoys up the larvae, stimulates them to action, and keeps the food suspended. Such gentle currents were found to be a definite aid to the fish larvae in catching their food.

The larvae of those species studied, mackerel, sand dab, Prionotus, *Paralichthys oblongus*, tautog, cunner, and Urophycis, respond in like manner to similar conditions. All develop more rapidly at high than at low temperatures; all are injured by contact with rough surfaces and are very sensitive to water pollution, and all die within a few hours after absorption of the yolk sac unless they begin to feed at that time. In the labaratory the early post larvae of these species will feed on copepods and make rapid growth. Under sanitary conditions mortality before the critical period is almost negligible, being less than 10 percent in many cases.

Mackerel larvae, at least, are able to adapt themselves to salinities varying from 26 to 32 per mille. The limits of adaptability may be found to be even more widely separated.

SOUTH ATLANTIC AND GULF FISHERY INVESTIGATIONS

INVESTIGATIONS OF THE SPAWNING HABITS, EMBRYOLOGY, LARVAL DEVELOPMENT, AND RATE OF GROWTH OF FISHES

Studies pertaining to the spawning habits, the embryology, larval development, and rate of growth of fishes of the South Atlantic States were continued by Dr. Samuel F. Hildebrand, assisted during most of the year by Louella E. Cable and the rest of the year by Nell Henry. Besides the collection of additional material and data, and preliminary

studies and identifications, a manuscript amply illustrated with drawings, on the spawning habits, the embryology and larval development of three species of blenny was completed and submitted for publication. Another manuscript, with drawings, embodying the results of similar studies pertaining to four species of goby also was completed and submitted for publication. Although the blennies and gobies studied are too small to be of direct economic value, they are numerous enough in many localities to serve as a forage fish for larger commercial species.

Comprehensive studies of the larval development, the distribution of the young, and rate of growth of eight species of Sciaenoids, namely, *Menticirrhus americanus*, *M. saxatilis*, *M. littoralis*, *Larimus fasciatus*, *Stellifer lanceolatus*, *Cynoscion regalis*, *C. nebulosus*, and *C. nothus* were completed. A manuscript, well illustrated with drawings, embodying the results of the studies of the 5 species named first was prepared, and an account of the 3 species of Cynoscion was well under way at the close of the year.

The 3 species of Menticirrhus, or king whiting, as well as the 2 species of Cynoscion (*regalis* and *nebulosus*) or sea trout studied, are all of much commercial importance. The extensive additions to our knowledge of the life histories of these fishes will prove most valuable when the time comes, as it no doubt will, that regulations for their protection and conservation must be enacted.

ICHTHYOLOGICAL STUDIES

Ichthyological studies of the marine fishes on the coast of the Southern States were continued. Particular attention was paid to the summer flounder and allied species of the genus Paralichthys. These species which are all food fishes of much importance in the fisheries are very similar in appearance and difficult to distinguish. This was an almost insurmountable stumbling block in the way of a study of their rate of growth, habits, and life history. By an intensive study, distinguishing characters have been recognized by which the different species may be positively segregated without difficulty. The geographical distribution of the various species has been worked out, and also, their economic importance.

On the coast of the Southern States there are present two common and distinct species of flounders belonging to the genus Paralichthys. The interesting fact was also discovered that one of these species is naturally quite small, and not of much important commercial importance except for local consumption, but few reaching a sufficient size to enter the channels of trade; while the other species is the common market fish. In other words, individuals of the smaller species are not the young of the larger commercial species, as was generally believed. This fact, of course, has an important bearing on the problem of conservation.

Needed systematic studies of the common fishes of the Gulf coast belonging to other groups as well were continued.

SHRIMP INVESTIGATIONS

The investigation of the shrimp, which ranks first on the list of the important fisheries in the South Atlantic and Gulf area, has been continued during 1932, under the direction of Dr. F. W. Weymouth, professor of physiology at Stanford University, California, and Mil-

ton J. Lindner. This investigation, started in 1931, covers practically the entire range of the commercial fishery and has been supported by the States of Louisiana, Texas, and Georgia. Headquarters are maintained in New Orleans, the center of the shrimp industry, in quarters kindly furnished by the Louisiana Department of Conservation, and field stations are located at Beaufort, N.C., Brunswick, Ga., and Aransas Pass, Tex. Intensive life history and oceanographic studies are being carried on in Louisiana, with the excellent cooperation of the Louisiana Department of Conservation, through its bureau of research and statistics. This department, besides supplying quarters for the Bureau's investigators, also furnishes the crew and operating expenses of Fisheries launch *Black Mallard*. Through the generous support of the Texas Game, Fish, and Oyster Commission and the Georgia Department of Game and Fish, the Bureau of Fisheries was enabled to place an observer at Aransas Pass, Tex., to sample the commercial shrimp catch, and another at Brunswick, Ga., with Fisheries launch *No. 58* and crew, to study the habits of the shrimp in that area.

As stated in the last annual report, the Bureau's investigators confined themselves chiefly to the problems concerning (*a*) life histories of the principal commercial species, including spawning, embryology and larval history, post-larval growth, longevity, and migrations; (*b*) abundance analyses; (*c*) biometrical studies of the principal species in respect to racial determinations and migrations; and (*d*) effect of fishing in relation to gear, localities, and time on composition of the shrimp catch and on the other species of economic importance. The investigators of the Louisiana Department of Conservation were to direct their activities toward the solution of the problems in respect to (*a*) habits and reactions of the young and adult shrimp in relation to food and food getting, migration, molting, spawning, and the effects of temperature and salinity; (*b*) the anatomy of the principal species of shrimp in relation to spawning and feeding; and (*c*) diseases and parasites affecting the shrimp.

In an attempt to attain these objectives, during 1932, in the region near Beaufort, N. C., 13 beam trawl and 76 otter trawl hauls were made for shrimp in both the inside and outside waters; 14 seine hauls were made for smaller post-larval shrimp in the muddy creeks and a number of plankton tows were taken in the waters adjacent to Beaufort, for the larval stages. Along the entire Georgia coast, launch *No. 58* made 362 hauls for shrimp with a regular 50-foot commercial otter trawl. Besides the otter trawl collections, a number of plankton tows and seine hauls were made. At Aransas Pass, Tex., 262 trawl boat catches were sampled. In Louisiana 188 otter trawl hauls, 106 plankton tows, and 27 seine hauls were made. With each otter trawl haul an accompanying hydrographic station was made. From the above operations, during 1932, over 85,000 shrimp were measured, sexed, and the gonad development recorded.

The operations in Louisiana are centered around 3 stations in Barataria Bay and 3 stations in the Gulf adjacent to the bay with occasional investigative trips to stations in other parts of the State. Barataria Bay is the focus of one of the most productive shrimping grounds in Louisiana and was selected as the base for intensive study because of its commercial importance and accessibility to New Orleans

where the laboratories are located. The stations have been so chosen that they represent a wide variety of ecological conditions that grade from the brackish waters of Bayou St. Denis in upper Barataria Bay to the saline waters of the Gulf 12 miles off Barataria Pass.

The stations are visited twice every half month and at each an otter trawl haul is made, the surface- and bottom-water temperatures, salinity, pH and turbidity determined, and, if conditions are suitable, a plankton tow is taken. When the trawl haul is completed the catch is emptied on deck and separated into piles according to species. Each species of fish is counted and recorded and a random sample of 200 *Penaeus setiferus* (common shrimp) is taken. Each shrimp in the sample is sexed, measured, and the gonad development noted. The measurements are made from the tip of the rostrum or "spine" to the end of the telson or "tailfin." They are taken to the nearest millimeter on an especially devised measuring board and recorded as total length. As the shrimp of lesser economic importance are found in the random sample of 200 common shrimp, they are separated out and later the same procedure of sexing, measuring, and gonad examination is carried out on them. In this way the ratio of the common shrimp to other species in the catch is determined.

Somewhat similar sampling procedures are followed in both North Carolina and Georgia, but in Texas the method of sampling is altered to fit the commercial fishery. Here the observer is located at a cannery from which he obtains random samples of shrimp from eight commercial trawl boats each week. The length measurements and other observations on the specimens are made in the same manner as in Louisiana.

There are three species of sea shrimp, all of which are members of the family *Penaeidae*, that are of commercial importance in the South Atlantic and Gulf States. The common shrimp or lake shrimp (*Penaeus setiferus*) comprises over 95 percent of the total, while the grooved shrimp (*Penaeus brasiliensis*) and the sea bob (*Xiphopenaeus kroyeri*) together yield the remainder. Since the common shrimp (*Penaeus setiferus*) is by far the most important commercial species, the investigations have been centered chiefly on solving the life history of this species. These investigations have already yielded many facts concerning the life history of the common shrimp (*Penaeus setiferus*), and a report is now in press covering some of the findings—a brief summary of the more important ones will be given here.

From an analysis of the length-frequency data gathered in North Carolina, Georgia, Louisiana, and Texas, it is evident that the common shrimp remains in the catch for only 1 year. In the Georgia area, the shrimp spawn from about the latter part of March until about the end of August. The young shrimp hatched in the spring, grow rapidly and appear in the fishery during July, with a mode at about 90 millimeters. These small shrimp-of-the-year furnish the heavy fall and early winter catch. The following spring they mature, spawn, and pass from the fishery. By the first of October, there is none of these year-old shrimp remaining in the Georgia waters; they disappear rapidly during July, August, and September, following the appearance of the young of the succeeding year class.

From all indications, the spawning seems to be in the outside waters or at least in waters of high salinity. The young post-larval stages, from 8 or 9 to 100 millimeters, are found in abundance on the inside

in the bays, creeks, and lakes associated with high temperatures, low salinities, and shallow muddy-bottom waters. As these young individuals grow, they move to more saline waters.

There is a differential growth rate between the males and females with the latter outstripping the former. In the young under 100 millimeters there is no significant difference in size between the sexes. In the spring, however, during the development of sexual maturity a differential growth is evident, in which the males are outstripped, so that in the spawning population the females are longer by nearly a tenth. There are also other morphological differences between the sexes; the males are characterized by having the inner ramus of the first pair of swimmerettes elongated and modified to form a structure termed the petasma which is apparently used in the transference of the spermatophores. This structure is lacking in the female.

That temperature influences the shrimp is evidenced by the fact that in Barataria Bay, La., during the fall of 1931, there was found a high positive correlation between the weekly average length of the shrimp and the average weekly air temperature. At the same time, there was a high negative correlation between the proportion of females in the catch and the temperature. In other words, an increase in air temperature was associated with an increase in the average length of the shrimp and a decrease in the proportion of females. Similarly a decrease in temperature was associated with a decrease in the average length of the shrimp and an increase in the proportion of females.

During the spawning season, there is evident a wide divergence in the proportion of sexes in the inside and outside waters of Georgia. From September 1931 to March 1932 the females were slightly more abundant than the males in both the inside and outside waters. Beginning about April (for both 1931 and 1932) the percentage of females on the inside rose rapidly until by June over 80 percent of the population in the inside waters was composed of this sex. After the June peak, the percentage dropped until the disappearance of the large year-old shrimp from the catch made it impossible to follow the sex ratio of this group. During the period of rapid rise in the proportion of females on the inside, there was also a change in the proportion on the outside. At first there was a rise in the percentage of females then a rapid drop to about 30 percent, where it remained until the large group disappeared.

For the first two months following the appearance of the young shrimp-of-the-year in the commercial catch, the males outnumbered the females in this group in both the outside and inside waters. That the rapid rise of the proportion of females on the inside and the decline on the outside was closely associated with spawning can hardly be doubted, as these changes in the population appeared during the height of the spawning season.

The shrimp is apparently omnivorous in its feeding habits as a wide variety of both plant and animal remains have been found in the stomachs.

In an attempt to determine the effect of trawling on species other than shrimp, an extensive survey was carried on for 2 years in Georgia. From October 1, 1930, to September 30, 1932, 386 hauls were made by launch *No. 58* in the inside tidal waters of Georgia suitable for commercial trawling operations. (Similar studies are now in progress

in Louisiana.) In these 386 hauls made with the ordinary commercial gear, a total of 530,176 fish were taken, an average of 1,373½ fish per haul. The table given below shows the total number and the average number per haul of bullhead minnows, important sports fish and all other species caught in these 386 hauls.

Species	Total number of fish taken in 386 hauls in inside waters	Average number of fish per haul	Species	Total number of fish taken in 386 hauls in inside waters	Average number of fish per haul
Bullhead minnow	238,354	617.5	Bluefish	394	1.0
Spot	49,174	127.4	Other species	158,909	411.7
Croaker	45,809	118.7			
Summer trout	25,952	67.2	Total	530,176	1,373.5
Whiting	11,584	30.0			

As shown in the table, almost half the total catch (45 percent) was represented by the bullhead minnow (*Stellifer lanceolatus*), a fish of no sport or commercial value, but still of importance as a source of food for other species. Excluding the bullhead minnow, five sports fish, namely, croaker (*Micropogon undulatus*), spot (*Leiostomus xanthurus*), summer trout (*Cynoscion regalis*), whiting (*Menticirrhus americanus*), and bluefish (*Pomatomus saltatrix*), comprised 45½ percent of the fish remaining. Since the majority of summer trout, croakers, spots, and bluefish, and a large proportion of the whiting, were undersized and immature fish that could not be utilized for food purposes, it is evident that a great deal of destruction was done by the trawlers. In the ordinary commercial operations most of the fish and smaller shrimp caught in the trawls are dead or moribund before the process of sorting has been completed and they can again be returned to the water. If the young individuals are not dead, they are so weakened from packing in the trawl and exposure on the deck of the vessel that when thrown back they fall easy prey to sea gulls and larger fish. Furthermore, since the inside waters of Georgia are restricted in extent and since they are important nursery grounds for shrimp and many species of fishes, it has been recommended that these inside waters be closed to trawling.

Experiments are in progress in Louisiana which it is hoped will throw light on the amount of shrimp that escape through the meshes of the trawl and to determine if it is feasible to devise a trawl which will allow the smaller shrimp to escape unharmed. This is not an easy undertaking as the shrimp are readily killed and their shape makes it difficult for them to pass through the meshes of a net without becoming entangled and badly mutilated. A canvas tubing is being devised which will fit over the cod end of a trawl and allow everything that passes through the trawl to be washed into a live car on the surface. With this apparatus the effectiveness of a savings gear can be determined as it will enable a record to be made not only of the number of shrimp and small fish escaping through the meshes of the trawl, but also whether these individuals are living or dead—a necessary requisite of any savings trawl.

With the shrimp fishery based wholly on immature and maturing individuals and with the evident short life of the common shrimp,

it is apparent that when depletion once sets in it is likely to be disastrously rapid, and all possible methods should be used to foresee depletion and prevent its occurrence. In Louisiana, steps toward this end have already been taken. Commissioner of Conservation Robert S. Maestri, at the instigation of M. J. Lindner of the Bureau of Fisheries, and Col. Hu B. Myers and James P. Guillot of the Department of Conservation, inaugurated a system of shrimp-catch records which will eventually yield invaluable information on the abundance of the shrimp. It is required of all dealers and ice-boat captains, or anyone who buys shrimp directly from the fishermen, to fill out a form, in triplicate, giving the name of the dealer, the name of the fisherman, the name of the boat, the type and size of net used, the locality in which the shrimp were caught, the amount of shrimp, and the price paid. These forms are furnished free by the State to all dealers, and the field agents of the Department of Conservation collect the completed tickets twice each month. It is hoped that the other States in which shrimping is an industry will follow the excellent example set by Louisiana in securing information on the status of the fishery, for it is only from such records that sufficient information can be obtained to determine the real abundance of shrimp.

PACIFIC COAST AND ALASKA FISHERY INVESTIGATIONS

With the exception of the investigation of the sockeye salmon of Puget Sound the major field projects of the Pacific coast fisheries were continued in Alaska. No new programs of investigations were initiated during 1932, and because of curtailment of funds the work dealing with the steelhead trout of the Rogue River was discontinued. Funds were not available for the employment of an investigator to take charge of the Bristol Bay red-salmon problem. However, scale samples from this region have been secured through the cooperation of the Alaska Division of the Bureau of Fisheries.

All of the investigators have been stationed at the Fisheries Biological Station in Seattle when not in the field.

PUGET SOUND SOCKEYE-SALMON INVESTIGATION

An investigation dealing with the sockeye-salmon fishery of Puget Sound was initiated by J. A. Craig during the preceding year. The program adopted in relation to this particular problem had as its aim the devising of a reliable index of the annual abundance of the sockeye salmon and solving the question of whether or not the abundance of the fish varies in a regular and constant manner during each fishing season; also, if these regular variations do exist whether or not they are due to individual races of these salmon migrating through the fishery at fairly constant dates from year to year. If the presence of such individual "runs" or "races" can be established, their fluctuations in annual abundance can then be studied in detail apart from the total run, since it is possible for certain parts of a red-salmon migration to be more severely depleted than others.

In order to solve these problems, a statistical study was made of the daily catches of a selected group of traps. Records were procured from the years 1917 to 1930, inclusive. Since the traps selected had not been moved in location or altered in construction during these years, each constituted a constant unit of fishing gear. Records of

daily catches were available, hence a fishing day provided a constant unit of time. From these data the result or catch of a constant unit of fishing effort was calculated from the records of each trap, and from the records of all of the traps for each year or portion of a fishing season. Seasonal trends of the catches were also computed for the individual years.

Using standard methods for computing index numbers, the records of the individual traps were combined into an index of size of catch per unit of fishing effort for all of the traps during the years in which data were available. Since these catches are the results of the use of constant units of fishing gear it should be a reliable index of the abundance of the Puget Sound sockeye salmon. The total amount of fishing gear on Puget Sound has decreased during the years under consideration. Therefore, any drop in average catch per unit of effort is not due to increased competition between gear. The trend of this index indicates a steady decline in the numbers of sockeye salmon from 1917 to 1930.

An outstanding feature of the seasonal trend of the fishery is a large peak in midsummer. This period of great abundance has apparently suffered the greatest depletion.

From the results thus far achieved it appears that it may be possible to correlate certain regular seasonal fluctuations in abundance with definite races of salmon entering the Fraser River.

Catch records from the fishing seasons of 1931 and 1932 have only recently become available and will be added to the data so far considered to complete this study.

During 1929 an experiment was undertaken at the Bureau of Fisheries' hatchery at Birdsview, Wash., to determine the most effective time at which to liberate young sockeye salmon. With this object in view 24,000 fingerlings were liberated in the fall of 1929 after being marked by the removal of their left ventral fins. On the following spring another 24,000 fingerlings from the same brood were liberated and marked by the removal of the right ventral fins.

Returns from these experiments were secured during the fishing season of 1932. Approximately 600 fish were recovered, the spring liberation returning in a ratio of about 4 to 1 to the fall liberation. Full data regarding length, locality, and date of capture, and scale samples were taken from these fish.

All of the marked fish recovered after entering the Skagit River were found in Grandy Creek where they were liberated, none being taken at the weir on Baker River. This adds additional confirmatory evidence to the theory that sockeye salmon return to their parent stream to spawn.

These data will be considered for the purpose of not only determining the proper time of liberation, but also of providing some information on the rate of mortality of these fish in the ocean and the importance of the Skagit River sockeye-salmon run to the commercial fishery of Puget Sound.

KARLUK RED-SALMON INVESTIGATION

The scientific investigations which have been carried on for a number of years at Karluk River were continued during 1932. Scale samples were collected throughout the season for the purpose of

determining the age composition of the run, which numbered approximately 1,500,000. Ten groups, consisting of fish of different ages and which had spent varying periods in fresh water before migrating to sea, were present. These were returns from 4 brood years, namely: 1925, 1926, 1927, and 1928. The majority of the run was produced by the brood years of 1926 and 1927, the former furnishing 589,000 fish and the latter 790,000. At the present time complete data are at hand as to the total return of fish from the brood years of 1921 to 1925, inclusive, but more data are necessary before any definite conclusions can be made as to the necessary magnitude of an adequate spawning reserve.

The marking experiments were continued, 59,000 seaward migrants being marked and liberated. In previous years the same mark or marks have been used throughout a season's marking. This year four marks were used: First, the amputation of the right ventral and adipose fins; second, the right pectoral and adipose; third, the left ventral and adipose; and fourth, the left pectoral and adipose. Thus the marking was divided into four separate experiments. Fifteen thousand seaward migrants were marked in each experiment except the fourth. Only 14,000 were used for the fourth experiment as the migration ended and it was impossible to obtain more. The marking was carried on from May 27 until June 22. It has been noted that the age composition of a migration changes from day to day during the migration, also the size frequency distribution of all age groups decreases as the migration proceeds, and the purpose of this added feature of the marking experiment is to determine whether or not the migrants which appear early in the migration also appear early in the season when they return as adults. These experiments will also determine whether or not a differential mortality exists between the large and small individuals of the same age group during their stay in the ocean.

The main purpose of the marking experiments is to determine the mortality of the fish during their stay in the ocean. By marking a given number of seaward migrants and then sampling the run during the years when they are returning the total number of marked fish returning may be calculated. Knowing the number of fish marked and the number returning, the mortality rate in the ocean can be determined. The problem is slightly complicated due to the fact that the fish from a given seaward migration remain in the ocean for varying periods of time ranging from 1 to 3 years. It is necessary, therefore, to sample the run during the three years following a marking experiment to determine the total return from that experiment. During the past season 159,279 Karluk red salmon were carefully examined and 1,215 marked fish were recovered of which 13 were from the marking of 1931; 1,090 were from the marking of 1930, and 112 were from the marking of 1929.

Knowing the mortality of the fish in the ocean, the number of seaward migrants resulting from a given spawning can be calculated, and as the number of fish in each spawning escapement is ascertained by means of a counting weir which is operated in the river the ratio of the number of seaward migrants to the number of fish in the escapement from which they were derived can be calculated. There is reason to believe that fluctuations in this ratio from year to year are to a large extent responsible for the fluctuations in the size of the

returns from escapements of similar magnitudes. Limnological data from Karluk Lake are collected each year, three trips having been made during 1932 for this purpose. With a knowledge of the fluctuations occurring in the ratio of the number of migrants produced per spawning fish an analysis of the limnological data should throw considerable light on the causes of the fluctuations.

This investigation is being carried on under the general direction of Dr. Willis H. Rich of Stanford University.

CHIGNIK RED-SALMON INVESTIGATION

An investigation of the red-salmon runs of Chignik River, Alaska, which is being conducted by Harlan B. Holmes, has continued along the same general program as in preceding years. One of the principal objects of this investigation has been to determine the relation between the number of spawning fish in 1 year and the resulting number of fish in the runs of future years. From this information we should learn what part of each year's run may be allowed to the commercial fishery, and what part must be reserved for spawning.

Numerous peculiarities in the composition of the runs and the life history of the fish have delayed conclusions in the investigation. At the very beginning of the investigation it was found that the scales of the fish were confusing and that confidence in age determinations based upon them would require an investigation of the life of the young fish in fresh water. As this part of the investigation has progressed many confusing irregularities in the life of the fish, which would be reflected in their scales, have been observed.

A lack of uniformity in the age composition of the catches of the several traps necessitated a careful study of methods of sampling. Preliminary results of this work have shown that extensive samples will be required for a satisfactory age analysis of the run.

There are many indications that the general run of red salmon in Chignik River is not one homogeneous population but consists of 2 self-perpetuating races represented by fish that spawn in the 2 lakes of the Chignik watershed. Although the fish of the two races differ only slightly, if at all, in anatomical characters and appearances, they have different habits. In addition to spawning in different parts of the river system, they differ significantly in time of spawning migration, length of time spent in fresh water as fingerlings, and age at maturity. There probably are significant differences in the rate of mortality of the two races.

We now have complete returns from five counted escapements. Preliminary analysis of these data indicate generally larger returns from larger escapements but there is considerable variation in the returns from a given number of spawners. A part of this variation is believed to be due to varying proportions of fish of the two races in the runs. It is hoped that when the data for the two races can be more accurately segregated the ratio of escapement to return will be found to be less variable.

Mr. Holmes, assisted by George B. Kelez, and Elmer E. Enterline spent the months of May to September at Chignik. The routine collection of data for age analysis of the run of mature fish and observations of the life of the young fish in fresh water were continued; a program of limnological observations was started; and a great part

of the fish in the commercial catch were looked over for individuals that previously had been marked as fingerlings. Only about 100 marked fish were recovered, but these few have added materially to our knowledge of the habits of the fish and the interpretation of their scales. They have shown, for example, that a great part of the fingerlings that are observed throughout the summer in the river below the lakes are not seaward migrants. They evidently move back into the lake and do not migrate until the following spring. This habit has not been observed in other rivers.

Special attention was given to determining the distinctive characters of the presumed two races of red salmon that populate the two lakes in the Chignik system. In order to permit following a group of fish of known origin an effort was made to catch and mark fingerlings in the upper lake. The unusually great number of mature fish interfered with seining for the fingerlings and only about 9,000 were caught and marked.

The run of mature red salmon at Chignik in 1932 was the largest for many years. This large run was derived mainly from 5-year fish that developed in the upper lake and 6-year fish that developed in the lower lake.

COPPER RIVER RED-SALMON INVESTIGATION

Because of the much reduced appropriation made available for biological investigations in Alaska, there were no employees of the Bureau detailed to continue the exhaustive study of the red-salmon runs of the Copper River which was begun in 1929. Seton H. Thompson, formerly engaged in this work, was detailed during the year to assist the Chief of the Alaska Division with administrative duties. In order that the work already completed would not be entirely lost, arrangements were made for the continued sampling of the daily catches of red salmon and for the collection of statistics relative to the daily catch of salmon by each fishing boat operating in the Copper River area. This work was done under the direction of Warden N. O. Hardy, and excellent data were obtained.

An examination of the spawning grounds after the close of the commercial fishing season was also undertaken by Warden Hardy, and it was concluded that the escapement, although approximately equal to that of the preceding year, was not adequate.

The study of the scales taken by random sampling of the commercial catch has been continued by Mr. Thompson at odd times, and the results of previous scale readings have been tabulated and analyzed. Twelve distinct groups are represented in the samples examined to date. These groups consist of red salmon maturing at ages varying from 3 to 7 years which have spent from 1 to 4 winters in fresh water. Two of these age groups no longer appear in the commercial catch because of the highly selective 5½-inch stretched-mesh gill net now in almost universal use in the red-salmon fishery, and one age group appears only occasionally. The two age groups no longer taken are grilse, which sampling has indicated are always males of very small size and therefore of slight importance to the industry. In all years for which samples have been fairly complete three age groups have comprised from 96 to 99 percent of the catch. Of these, the fish maturing in 5 years which have spent 2 winters in

fresh water form the predominating age group, and comprise from 78 to 82 percent of the catch. Fish maturing in 4 years after having spent 2 winters in fresh water, and those maturing at 6 years after having spent 3 winters in fresh water form the other two important age groups which appear in about equal numbers in the catch.

During the field season of 1931 data were collected for the purpose of showing whether or not the red salmon utilizing distinct spawning areas of the Copper River developed physical characteristics by which they could be identified. A comparison of such physical characters as number of vertebra, number of fin rays, number of branchiostegal rays, and number of gill rakers does not show them to differ statistically on fish from three important spawning areas. A further study of the scales of fish from these tributaries is expected to provide indications of racial differences.

A preliminary analysis of catch statistics of the Copper River indicates depletion as the result of overfishing in the period of peak production from 1915 to 1922, and the catch of recent years strongly reflects the beneficial effects of the regulations imposed in 1924 and subsequent years.

PINK-SALMON INVESTIGATION

In order to provide protective regulations for the pink-salmon run in any stream or locality it is imperative to know if the salmon hatched in that stream or locality return to it as adults. This brings up the problem of determining the degree of individuality maintained by the pink-salmon populations in different streams. The conventional manner of solving such problems has been to mark the salmon fry as they leave the streams and then observe the adult run that returns, for individuals bearing the marks. Two experiments of this nature have been completed thus far in the pink-salmon investigation by Dr. Fredrick A. Davidson—one at the Government hatchery on the Duckabush River in Washington, and one in Snake Creek at Olive Cove, Alaska. The pink-salmon fry were marked in both of these experiments by means of clipping their dorsal and adipose fins. Thirty-six thousand fry were marked at Duckabush in the spring of 1930, and 50,000 fry were marked at Olive Cove in the spring of 1931. The results from these experiments indicate that the majority of the fry originating in these streams return to them as adults. There were a few marked adults found in the neighboring streams both at Duckabush and at Olive Cove, but the degree of straying was comparatively meager.

There are over 500 streams in southeastern Alaska in which pink salmon spawn by the thousands each year. These streams vary in size from large river systems to small creeks. Some of the streams are more or less isolated along unbroken shore lines whereas others are centralized in large bays and inlets. Until marking experiments are carried on in streams of both categories, no definite conclusions can be drawn in regard to the degree of homing instinct inherent in the pink salmon.

The pink salmon in Snake Creek at Olive Cove and in Anan Creek in Bradfield Canal have been measured each summer for the past 3 years in an attempt to determine the differences, if any, in the body characteristics of the salmon composing the populations in the two

streams. The results from this phase of the work, which is generally referred to as a racial analysis, thus far indicate that the Snake Creek pink salmon differ quite distinctly from the Anan Creek pink salmon in a number of body characteristics. There are likewise a few similar characteristics between the two populations, and until further data are secured no definite conclusions can be reached. However, since the marking experiment at Olive Cove indicated that there was very little straying of the Snake Creek salmon into Anan Creek it would seem that the results from the racial analysis of these two populations are consistent with the results from the marking experiments. In this way the degree of homing instinct inherent in the pink salmon may be determined from two different types of investigations, each of which may be used to substantiate the results of the other.

STATISTICS OF THE ALASKA SALMON FISHERIES

During the past year the work of compiling and analyzing the statistics of the Alaska salmon fisheries up to and including 1927 has been completed by Dr. W. H. Rich, of Stanford University and E. M. Ball, assistant in the Alaska service. The report covering this work has been issued in several sections: Part III, dealing with the statistics of Prince William Sound, Copper River, and Bering River was published during the year; and part IV, covering the data for southeastern Alaska, was completed and submitted for publication. The statistics for the next 5 years, 1928 to 1932, inclusive, are now being worked up in furtherance of the plan to provide full information as to the state of these fisheries at 5-year intervals.

HERRING INVESTIGATIONS

During 1932 the herring investigation, under the direction of Dr. George A. Rounsefell, assisted by Edwin H. Dahlgren, submitted a report to the Bureau giving the results of experiments to determine the feasibility of tagging herring. Herring were held in a live box and tagged experimentally. It was found that silk ribbons through the opercle or body of the fish were not successful. Metal strap tags attached to the upper lobe of the caudal fin, as in salmon-tagging experiments were also not a success as the tags were a constant source of irritation causing rotting of the fin. However, herring with small metal strap tags affixed to the opercle did not show any significant difference in mortality from the untagged controls. Success was also obtained for small flat metal tags inserted into the body cavity.

Because of the tremendous numbers of herring handled by the operators it was deemed necessary to recover tagged herring from the commercial catch by mechanical means. Accordingly, a method was devised, new to fishery science, whereby the tags were recovered from the fish meal by means of powerful electromagnets. The tags themselves were made of pure nickel, which is sufficiently magnetic for the purpose and is very resistant to corrosion.

Preliminary tagging experiments in the field were made during 1932 in southeastern Alaska. Out of 1,034 opercle-tagged herring released July 27 at Port Conclusion, 10 were recovered from the 28 percent of the catch mechanically searched for tags during the

remainder of the season (to October 1). All were recovered within 12 miles of the point of tagging of necessity as the fishery was conducted around Cape Omnaney during all of the last half of the 1932 season. The time elapsing from release to capture varied from 2 to 43 days. It is planned to continue these experiments as a knowledge of the grounds occupied by each race of herring during the summer months will permit a more advantageous utilization of this resource for it will then be possible to measure more accurately the abundance of each race of herring and regulate the intensity of fishing in each area accordingly.

Work has been progressing satisfactorily on the southeastern Alaska racial data. Analyses have been made of vertebral counts, rates of growth, and a few body measurements. Although the analysis is not complete the results so far attained show the presence of several distinct stocks or populations, inhabiting the regions in the vicinities of Noyes Island, Cape Omnaney, Peril Strait, Juneau, Petersburg, and Wrangell.

Samples of herring for racial study were obtained during 1932 from Farragut Bay, Seymour Canal, and Cape Bendel, all in Frederick Sound. These samples should help materially in solving the relationship between the herring of the central Chatham Strait region and those in the "inside" waters.

The annual samples for making the usual observations on the condition of the supply and for the continuing the study of dominant year classes were collected from Prince William Sound. In the Kodiak-Afognak district large samples were obtained from Malina, Paramanof, Uganik, and Shearwater Bays.

In the Aleutian Islands district a large number of samples were again collected by Marcus Meyers from Dutch Harbor. In this area the 1923 year class has been overwhelmingly dominant since the inception of the fishery in 1928. It has varied from 82 to 60 percent of the catch from 1928 to 1931, inclusive. Since this important fishery has been so largely dependent for several years on the result of one year's spawning it is obvious that a very close watch must be maintained to see that the supply is not entirely depleted before another abundant year class appears in the catch.

ALASKA RAZOR-CLAM SURVEY

Observations on the razor-clam bed in the Prince William Sound, Copper River, and Bering River areas in 1932 were made as in past years by Paul E. Thompson of the Alaska Division, in connection with the enforcement of the clam-fishery regulation.

Sampling was continued to determine the age composition of the commercial catch and shows that more than 80 percent of the clams taken in 1932 belonged to the 5-, 6-, and 7-year-age groups. Approximately 92 percent of all clams taken in the commercial catch in 1932 were mature, but only about 44 per cent had spawned more than once as compared with more than 55 per cent in 1931. An examination of the samples of recent years shows an annual decrease since 1929 in the relative numbers of clams of the older age groups taken in the commercial fishery. This has been accompanied by an annual increase in the commercial catch of clams 5 years old, most of which have not spawned more than once.

The increased take of razor clams of minimum legal size is believed to be caused partly by the increased intensity with which operations have been prosecuted. The pack of 1932 was considerably larger than that of any recent year in spite of the fact that the open season was curtailed by about 3 weeks. To prevent further expansion of the industry which would result in serious depletion of the beds, regulations have been promulgated which prohibit the taking of a combined total of more than 1,200,000 pounds of razor clams, including shells, from these waters. This is the equivalent of 30,000 cases of 48 one-half-pound cans or approximately 65 percent of the pack prepared in 1932.

CONSERVING FISH LIFE BY USE OF SCREENS AND LADDERS

An investigation of means of improving screens at the mouths of irrigation ditches and fish ladders over power and irrigation dams was begun by the Bureau of Fisheries in 1928 and has been continued to date by U. B. Gilroy, engineer, with the advice of Shirley Baker, consultant. The principal activities in 1932 included: (1) Completion of construction of revolving mechanical screen on Jocko Canal in Montana; (2) continued operation of mechanical and electrical fish screens and fish ladders on Government projects in the States of Washington, Oregon, and Montana; (3) field inspection of sites and production of detailed designs and cost estimates on 13 mechanical screens for diversions ranging in size from 5 second-feet to 1,100 second-feet in Washington, Oregon, Idaho, Utah, and Nevada; (4) detailed design for fish ladder for upper Salmon Falls development of Idaho Power Co. on the Snake River; (5) consulting service rendered State commissions of Oregon, Nevada, Utah, Idaho, and Montana, and to the Government of New Zealand on fish screen and ladder problems; and (6) special engineering service in connection with activities of United States Bureau of Fisheries in the construction of water supplies and hatchery buildings.

MECHANICAL FISH SCREENS

The revolving mechanical fish screen developed by the Oregon Game Commission in 1921 and adopted and in use by this Bureau since 1928 continues to be the best mechanical screen which has come to the attention of the investigators. This device, fully described in previous reports, is economical in operation, requires but little attention, and when properly installed can be relied upon to give positive fish protection. Under this investigation there have been prepared detailed designs covering recommended installations of this type of screen for ditch capacities ranging from 5 second-feet to 1,435 second-feet. Such screens have been installed at Jocko Canal and the Yakima Indian project, and plans were drawn up for 13 additional locations.

ELECTRIC FISH SCREENS

The history and development of the electric fish screen has been set forth in detail in the previous reports of this division. During 1932 the Bureau operated electric screens on the Government projects in the Yakima country and on the Kvichak River, Alaska. However, as set forth in the report for 1931, owing to public antagonism which

is likely to develop when even a very few fish are killed or stunned by electrified water, it is not the policy of the Bureau to recommend the electric screen for general use.

Sunnyside electric screen.—The Sunnyside Canal (capacity 1,500 second-feet), main diversion of the Yakima project of the Reclamation Service, diverted water from March 14 to October 10, inclusive. During the period of maximum irrigation demand which coincides with the chief period of migration of fish, the flow of the canal exceeded 1,000 second-feet. This canal is the lowest screened diversion on the Yakima River. This year operating conditions were much more favorable than during the preceding season, there being a large overflow at the dam to serve as a bypass for the fish. In the past during flood, drift has piled up against the Sunnyside headgates interfering with the electrodes. Permanent facilities for handling such drift have now been provided through the cooperation of the Bureau of Fisheries and the Reclamation Service in the installation of a mechanical winch.

The operation of the Sunnyside electric screen was uninterrupted throughout the irrigation season. Other electric screens were operated successfully at the Wapato Canal, Old Indian Canal, Tieton Canal, Naches Power House in Washington, and the Kvichak River in Alaska.

Kvichak electric screen.—The Kvichak River is considered the greatest red-salmon stream in the world. This electric screen is used in connection with the counting of the escapement of salmon up the river to the spawning grounds. This year the Kvichak screen was installed at a point approximately 12 miles upstream from the site used in 1930. At this new location 2 islands, each about one half mile long, divide the river into 3 channels. The electric screen was installed across the central channel at the lower end of the Islands. This central channel, about 660 feet wide, is too deep and swift to permit the installation of the usual type of wooden rack and counting gates. The racks closing the side channels were located at the upper end of the islands.

The screen consisted of an upstream row of electrodes of ⅜-inch galvanized chain properly weighed and suspended in the water from a piling support. The other side of the electric circuit was connected to a 2½-inch diameter galvanized-iron pipe paralleling the chain electrodes at a point 20 feet downstream. This pipe electrode was supported from a row of piling and so suspended as to clear the bottom of the channel by about 1 foot. Power was furnished from a 9-kilowatt, 125-volt, 60-cycle alternating-current generator driven by a 15-horsepower Fairbanks-Morse gas engine. Approximately 80 volts was found to be the most effective potential at the screen and at this voltage the installation drew approximately 50 amperes.

The action of the electric screen in diverting salmon away from the central channel and directing them up the side channels to the counting weirs was practically 100 percent effective. During the period from June 28 to August 5 the actual count of salmon passing through the Kvichak weir was as follows: 5,064,014 red salmon, 5,753 kings, 1,020 chums, and 200 pinks. No fish were observed to pass through the electrified area, and they showed no hesitation in being diverted to the side channels. Throughout this enormous run less than 200 salmon were found to have been killed by the electric

current, and these electrocutions were confined to an area where an eddy current prevented fish from escaping to safe water after contact with the electric current.

This year's success with the Kvichak screen illustrates the great importance of proper location, for the same screen installed in 1930 at a downstream site failed to function as a diverter. It is felt that the construction of the wooden racks in separate channels well removed from the electrified area has offered distinct advantages.

Check of fish in Yakima ditches.—This year, as in previous seasons, a comprehensive check on fish left stranded in the Yakima ditch systems was conducted at the end of the irrigation period. These final checks together with special checking operations and close observation of fish migration in the canals and rivers were conducted throughout the summer and fall, and as in previous years, the count indicated that the Tieton electric screen operates with high efficiency. The effectiveness of this screen is brought out strongly by comparison with fish conditions on the Selah-Naches Canal (capacity about 300 second-feet) which diverts water from Tieton River under conditions similar to those existing at the Tieton diversion. A complete check of fish left stranded in the Selah-Naches system showed, by actual count, 855 salmon, 188 trout, 1,027 whitefish, and 129 culls, with an estimated additional total of 450 fish of all kinds that had escaped seining.

FISH LADDERS

The Bureau has installed and now supervises the operation of fish ladders at Sunnyside Dam of the Reclamation Service, Yakima River, Wash.; at Wapato Dam of the Indian Service, Yakima River, Wash.; and at Sprague River Dam of the Indian Service on Fort Klamath project, Oregon. These installations are all of ample design and of substantial reinforced-concrete construction. All reliable observations point to the thoroughly satisfactory operation of these ladders in passing the fish migrations of 1932.

Upper Salmon Falls ladder.—The fish ladder for the upper Salmon Falls Dam of the Idaho Power Co. was designed early in 1932, and is located on the Snake River near Hagerman, Idaho. The construction of this development, which will raise the water approximately 16 feet, was started in the summer of 1931, but the work has been temporarily suspended due to power market conditions. The power company has worked in close cooperation with the Bureau and the design of the dam includes provisions for the construction of this fishway as an integral part of the dam structure.

Rock Island fish ladders.—In previous reports this major power development of the Puget Sound Power & Light Co. on the Columbia River near Wenatchee, Wash., has been described in detail. The summer migrations of 1932 provided the first test of the two huge fish ladders installed according to the specification of the Bureau of Fisheries and the State commissions of Washington and Oregon. Throughout the summer there was an abundance of overflow at the dam.

The west channel ladder, constructed 800 feet downstream from the location originally proposed, possesses marked advantages over the originally planned structure being composed largely of pools excavated in solid rock and possessing better entrance facilities.

The requirement for fish protection as stated in the project license from the Federal Power Commission provides for the construction of a third ladder if this structure appears necessary. All available data indicate that the two ladders now built functioned satisfactorily in passing the 1932 fish runs, and it would seem but fair and proper that no demand for the expensive construction represented by a third ladder should be made unless and until future reliable observations established the actual need of this structure and make possible an intelligent specification for its location and design.

Ariel development.—At this high head power development on the Lewis River in Washington the Inland Power & Light Co., in lieu of a fish ladder which would have been impractical at a dam of this height, has provided for the trapping of the upstream migrating salmon at the power house tailrace and the ripening, spawning, and rearing of these fish on an extensive scale. These provisions and operations have been described in detail in our previous reports. The fish protective works have now been completed and an agreement entered into between the company and the State of Washington. In this agreement compliance with the requirements for fish protection is acknowledged, the hatchery property and equipment is deeded to the State, and provision is made for an annual payment to the State of Washington for the operation of the hatchery. The Bureau of Fisheries has now formally approved of the agreement, thereby acknowledging the company's fulfillment of the requirements for fish protection as set forth in Federal Power Commission's license for the project. The feature of particular interest to this Bureau is the operation of the fish trap and the mechanical lifting device located over the power house tailrace. More than $57,000 was invested in this equipment. Several runs of salmon and steelhead have demonstrated the effectiveness of this type of equipment. It is believed that the methods here employed constitute the most progressive steps yet taken for handling upstream migrating fish at high dams.

FISH PROTECTION ON GOVERNMENT PROJECTS

In the spring of 1932 the Reclamation Service started construction of the Prosser power development which involves the diversion of 1,100 second-feet of water from the Yakima River near Prosser, Wash. At this project the dam was already provided with a satisfactory fishway, but there is a need for a screening device to conserve the downstream migrating salmon and steelhead.

At the present time the Reclamation Service is also constructing a dam on the Cle Elum River in the Yakima watershed which will raise the water surface of the river 140 feet and store 435,000 acre-feet of water. At this dam a fish ladder will not be feasible and neither the type of construction nor the plans for operating the reservoir favor the mechanical handling of fish and, if constructed, such mechanical equipment would be very costly.

Following thorough field investigation and conferences with the engineers of the Reclamation Service at Denver, recommendations of the Bureau of Fisheries were that, in lieu of attempts at costly mechanical handling, the Reclamation Service should allot to the Bureau 5,000 acre-feet of storage each year to be used specifically for fish

protection, and that a necessary fund be provided for racking the Cle Elum River below the dam site. As in the case of the Prosser screen, the field services of the Bureau of Reclamation and the Bureau of Fisheries cooperated fully to obtain this means of protection, but the matter came to a standstill before the higher authorities of the Reclamation Service, the position being taken that nothing could be done as the appropriation for the project carried no specific item for fish-protective work.

Need for a definite policy.—The experience of the Bureau of Fisheries in seeking to obtain very necessary fish protection at the Prosser power development and at Cle Elum Dam has brought out strongly the necessity for the determination of a definite policy between the Departments of Commerce and Interior which will provide the basis for securing proper safeguards to fish life on those Government projects where anadromous fish are affected. Until such a policy is adopted no tangible results can be secured by the field services. Furthermore, it should be provided that on streams where anadromous fish are affected all plans for new construction by the Department of the Interior be submitted to the Commissioner of Fisheries for recommendations as to fish protection, exactly as is now done in the case of private concerns seeking permits for power developments before the Federal Power Commission. Such a procedure would allow for economical planning of the fish-protective works, would permit of the project appropriation carrying a definite item for fish protection, and would allow the construction of the recommended devices along with the building of the project.

GREAT LAKES FISHERY INVESTIGATIONS

Investigations of the important commercial fisheries of the Great Lakes during the past year have been concerned almost wholly with the abundance and distribution of the various species of food fishes and the effects upon the fish populations of the various types of commercial fishing gear. Although the yield of the commercial fisheries in these waters has been maintained in the aggregate for several decades, it is generally known and recognized that depletion of the important species is occurring with greater rapidity in some lakes than in others, and that total production has been maintained by the substitution of less valuable species for the ones that are more valuable and better known. Lacking sufficiently detailed statistics of the fishery yield, in the States bordering these waters, the fact of depletion is taken for granted and no serious attempt has yet been made to study the fishery from a quantitive standpoint, tracing variation in yield as has been done with such success in the marine fisheries of this country. In recent years several of the Great Lakes States have adopted an adequate system of fishery statistics sufficiently detailed to measure variations in abundance of the fish stock. Until these records have accumulated, however, for a sufficient period of years to make their analysis worth while, the efforts of the Bureau's technical staff, under the direction of Dr. John Van Oosten, are directed toward the correction of abuses in the commercial fishery and especially the reduction of the tremendous wastage of immature and undersized fish that annually reaches impressive proportions.

Virtually all of the field work conducted on the Great Lakes in 1932 was confined to Lake Michigan (including Green Bay) and Lake Huron. One investigator carried on some field work on Lake Erie during the period, April 5–20. No new projects were started in 1932 and all the major field investigations begun in years previous to 1932 were brought to a close. The completion of these field investigations was made possible only by the financial support given by the States of Michigan and Wisconsin. The Bureau continued its cordial relations with the various Great Lake States and provided them with considerable information and scientific data that were used as a basis in the consideration of new regulations o the commercial fisheries. The Bureau has been particularly active in its endeavors to secure uniform legislation on the Great Lakes especially on Lakes Erie and Michigan. This is evident from the fact that during the past year Dr. Van Oosten attended some 15 conferences with State officials and fishermen for the purpose of presenting data and discussing or proposing new fisheries regulations.

In this connection it is of extreme interest to report the establishment of a permanent advisory committee whose primary duties are to consider and study all uniform legislation proposed for the fisheries of Lake Erie and to make recommendations and give advice to the departments of each State fronting Lake Erie and to the Province of Ontario. This Lake Erie Advisory Committee is composed of one representative from each participating State, the Province of Ontario, and the Bureau of Fisheries. Dr. Van Oosten was appointed chairman of this committee. The committee met twice in 1932 and through it the various States and the Province of Ontario were enabled to come to an agreement, making uniform certain proposed regulations on Lake Erie. The establishment of this committee is in line with the new policy advocated by the Bureau whereby the fisheries of the Great Lakes are considered for each lake seperately and only by those commonwealths that have a direct and controlling interest in them. The Bureau believes that this new policy will lead to greater and better results in the establishment of uniform laws on each lake.

Some progress has been made in 1932 in the compilation of the statistics of the catch of the Great Lakes in such form as to show the catch per unit of gear per unit of time. These statistics permit a study of the correlation of the catch and fishing intensity and thus enable a determination of the real trend in abundance of the various species of fish in the different lakes. The statistics collected by the State of Michigan have been made the starting point in this work. Those collected in 1927 and 1928 already have been worked up by districts for the four lakes controlled by Michigan. The statistics collected in later years will be compiled as rapidly as funds and time permit.

Through the courtesy of the Michigan Department of Conservation motion pictures were made showing the various phases of research work conducted by the Bureau on the Great Lakes. These pictures show in great detail the various field operations carried on by the *Fulmar* in the Lake Michigan investigation as well as the work conducted in the laboratory at Ann Arbor. This film will be one of a series of educational films produced by the State of Michigan.

The Great Lakes staff has contributed to nearly every issue the feature article of a newly established monthly magazine devoted exclusively to the commercial fisheries of the Great Lakes.

CHUB FISHERIES OF LAKE MICHIGAN AND GREEN BAY

The cooperative studies on the chub fisheries of Lake Michigan carried on in 1930 and 1931 (for details see report for 1931) were resumed in 1932. The Bureau's vessel *Fulmar*, employed for the work, was placed in drydock for repairs early in April and left Sturgeon Bay, Wis., on April 19 for the first cruise of the season. From April 19 to May 31 the work was restricted to Green Bay (for details of problem see report for 1930) and from June 1 to September 13 operations were limited to Upper Lake Michigan north of Frankfort, Mich., and Sturgeon Bay, Wis. The 1930 and 1931 operations had been restricted to that part of the lake which lies south of this line. During the 1932 season the *Fulmar* covered a total distance of some 6,096 statute miles and lifted some 161 miles of chub gill nets at 67 different stations. Fishing operations were conducted out of the ports of Marinette, Wis., and Escanaba, Mich., on Green Bay, and out of Manistique, Charlevoix, and Frankfort, Mich., on Lake Michigan. As was the case in previous years, nets were fished simultaneously out of those ports located on the same body of water.

In 1930 and 1931 five sizes of gill-net mesh were employed in Lake Michigan proper, but in 1932 only three sizes were used there, viz: 2½, 2⅝, and 2¾ inches. The 2⅜- and the 3-inch mesh were eliminated, as previous work showed that neither of these two sizes of meshes could be recommended for use in the chub fisheries. In Green Bay, however, the 2⅜-inch mesh was fished in addition to the 2½-, 2⅝-, and 2¾-inch. The lifting and setting of approximately 2 miles of gill nets, 7 nets of each size mesh, constituted 1 day's fishing operations in upper Lake Michigan. Some 3,276 lake trout that weighed 2,649 pounds and some 32,846 chubs that weighed 14,619 pounds were taken in upper Lake Michigan, while some 2,845 lake trout, 2,873 lake herring, and 1,367 chubs that weighed 1,616, 1,289, and 585 pounds, respectively, were taken in Green Bay. Biological data were secured for each individual fish, to the extent that time permitted, on the following: Length, weight, sex, maturity, scales (chubs only), stomachs (lake trout and lawyers only). A large series of chubs and lake trout were preserved for future study in the laboratory.

In addition there were collected 173 plankton samples, 91 samples of bottom organisms, and 69 soil samples for geological analysis. Temperatures were recorded whenever weather permitted. The study of surface currents by means of drift bottles was continued from 1931. In 1932 some 462 bottles were released and of this number 304 have been recovered to date, yielding a percentage return of 65.8, which is approximately 2 percent higher than the returns of 1931.

The data of the Lake Michigan chub-net investigation have been summarized for the 3 years, 1930 to 1932, and conclusions pertinent to legislative recommendations have been drawn and submitted to the conservation departments of Michigan and Wisconsin. The data are undergoing further analysis with a view toward detailed presentation in published form. Some of the outstanding conclusions follow:

1. The amount of destruction of baby lake trout (average weight about 12 ounces) by chub nets cannot be reduced by changing the mesh in these nets to a size that would still be suitable for the purpose of taking chubs. The adoption of any one of the three sizes of mesh (2½, 2⅝, and 2¾ inches) now legally employed in the different States fronting Lake Michigan will not alter the destructiveness of chub nets to small lake trout.

2. Chubs show a sensitive reaction to the size of mesh in gill nets in the number of fish taken per net. On the average, the number of chubs taken in the 2½-inch mesh gill nets is reduced by 38 percent with an increase in mesh to 2⅝ inches and by 62 percent with an increase in mesh to 2¾ inches, or in terms of weight in pounds the percentages of reduction are respectively 36 and 61 percent. With an increase in size of mesh from 2⅝ to 2¾ inches there is a corresponding decrease of 39 percent in both the number and weight of chubs.

3. Baby lake trout were found to be about 2.7 times as abundant in the Michigan waters of Lake Michigan as in the Wisconsin waters of this lake. In Michigan the sale of all baby lake trout is prohibited; in Wisconsin the sale of those taken in gill nets is permitted and, as a consequence of this, a large market has been developed for these immature fish. It is believed that this practice of selling these baby trout in Wisconsin is primarily responsible for the difference in its abundance in the two States. It has been recommended, therefore, that suitable legislation to prohibit or at least to curb the sale and transportation of these immature fish be enacted in those States that have no such restrictions at the present time.

4. Chubs were found to be about 2.7 times as abundant in the Michigan waters of Lake Michigan as in the Wisconsin and Illinois waters of this lake. It is believed that this difference in abundance is caused primarily by the difference in the size of mesh employed for chubs in the three States. Illinois permits a 2½-inch mesh, Wisconsin a 2⅝-inch mesh, and Michigan a 2¾- to 2⅞-inch mesh. It is common knowledge among the fishermen that the chubs are steadily decreasing in abundance in Lake Michigan especially along the Wisconsin shore. It is absolutely essential, therefore, that fishing intensity be decreased if the chub fisheries are to be saved. One of the most practical ways to do this is to increase the size of mesh in chub nets to a minimum of 2¾ inches. Such a minimum in size of mesh would, according to our data, reduce the catch of chubs about 39 percent in Wisconsin where most of the small mesh chub nets are fished. If such reduction in catch is not sufficient to enable the chubs to maintain the desirable level of abundance further restrictions, such as a closed season, will be necessary. An increase in the size of mesh would also give additional protection to the smaller chubs, would increase the average size of chub produced for the market, which increased size would in turn raise the price per pound paid the fishermen.

DEEP TRAP NETS OF LAKES HURON AND MICHIGAN

The deep trap-net investigation, begun in 1931 (see report for 1931), was resumed on May 7, 1932, and completed on October 20, 1932. The State of Michigan again cooperated with the Bureau by furnishing 3 field assistants and 2 automobiles for transportation. Deep trap and pound-net lifts were studied at Harbor Beach, Bay Port,

East Tawas, Ossineke, Alpena, and Cheboygan on Lake Huron and at Bervort, Epoufette, Naubinway, Cozy Harbor (Scotts Point), and Manistique on Lake Michigan, and at Escanaba and Marinette on Green Bay.

The data collected during the 2 years have been compiled and analyzed and show briefly the following facts that are pertinent to legislative recommendations:

1. The number of deep trap nets employed was larger in 1932 than in 1931.

2. The average number of both legal and illegal whitefish per lift was less in 1932 than in 1931 at those ports where lifts were observed from nets with the same size mesh set in the same depth of water and lifted on comparable dates in the 2 years.

3. Both the average total length and the average weight of the legal sized whitefish decreased slightly in 1932 as compared with corresponding averages in 1931.

4. The distribution by depth of water of both legal and illegal sized whitefish was practically the same for the 2 years—the illegal sized fish being most numerous in water from 81 to 109 feet in depth, while the legal sized fish were most numerous in water deeper than 110 feet.

5. The deep trap nets now in use have lifting pots with meshes ranging from 3½ to 5 inches in length, stretched measure.

6. In 1932 a wholesale transfer of deep trap nets occured from certain fishing grounds, long famous for its whitefish production, to new grounds, due to the paucity of whitefish on the old established grounds.

On the basis of the above facts the following regulations were proposed for the fishing of deep trap nets in Michigan waters: (*a*) Limit the depth of water in which these nets may be fished to 80 feet and less; (*b*) require the minimum size of meshes in the lifting pot to be 4½ inches in length, stretched measure, as found in use permitting a smaller mesh, not to exceed 2¼ inches, in one side of the pot for the purpose of shoaling fish.

STUDIES IN LAKE ERIE

Yellow perch.—A preliminary paper was published by Frank W. Jobes on the age and growth of the yellow perch of Lake Erie. The study was based on some 1,179 specimens taken in 1927 and 1928. Mr. Jobes found that the ages of these perch ranged from 1 to 6 years and that the year class of 1926 dominated the catch in both 1927 and 1928. Males and females grew in length at approximately the same rates during the first 4 years, with the exception that the females of the 1925 year class apparently grew significantly faster than the males in their third year—the summer of 1927. The most rapid growth occurred during the first 2 years with a sharp decline in growth rate during the third and a more gradual decline during the fourth year of life. The sharp decline in the growth rate during the third year may be associated with the attainment of sexual maturity. The yellow perch of Lake Erie require 4 years to reach a total length of 9 inches, the highest legal length limit for perch on the Great Lakes.

Other species.—Age determinations and length computations from scales have been completed for all the ciscoes and whitefish collected on Lake Erie during the years 1927 to 1931, inclusive. During the

period, April 5–20, 1932, biological data and scales were secured from some 1,329 yellow pike perch, 1,924 saugers, and 133 yellow perch from Lake Erie—a total of 3,386 fish. These data were necessary to complete the series collected in previous years and to make possible a study of the complete life history of the pike perches of Lake Erie.

Limnology.—No field work was done in 1932 on the limnology of Lake Erie, but Dr. Stillman Wright was assigned to the compilation of the large amount of data collected by the cooperative survey (see report for 1931), and to the preparation of the final report which is now nearly ready for submission for publication.

COOPERATIVE INVESTIGATIONS, INTERIOR LAKES OF WISCONSIN

In the cooperative investigations of the physical and chemical conditions in lakes of northeastern Wisconsin conducted by the Wisconsin Geological and Natural History Survey and the Bureau of Fisheries the very active program of investigation by the personnel of the State Survey was conducted by a field party of 11 biologists and chemists under the direct supervision of Dr. A. E. Birge and Prof. Chancey Juday at the Trout Lake Laboratory from June 27 to September 12, 1932. A study of fish life in these lakes was conducted by Dr. Ralph Hile and one assistant for the Bureau of Fisheries.

Materials obtained for the study of the age and growth of the fishes of the lakes of northeastern Wisconsin included data from 8,007 specimens. Of this number 1,407 ciscoes, 724 perch, and 329 rock bass were preserved. The preserved ciscoes are being used in a morphometric study bearing on changes of form with growth and on the question of the existence of local races of that species. The need of more exact formulas for the calculation of growth of the perch and rock bass from scale measurements has made necessary a detailed study of the change of the body-scale ratio with increase in age and size. The collections were again taken from the six lakes selected as "types."

With the 1932 collections of age and growth materials pertaining to the perch, cisco, and rock bass, the field work of this phase of the cooperative study of the lakes of northeastern Wisconsin is completed. Reports by Dr. Hile of the Bureau on the age, growth, and morphometry of the cisco and by Edward Schneberger of the Wisconsin Geological and Natural History Survey on the age and growth of the perch will be completed in the near future.

In general, the major part of the limnological investigations conducted by the Geological and Natural History Survey was done on the six lakes which were selected for an intensive study of the fish fauna, with the exception of observations on the penetration of solar radiation into the various lake waters; several other lakes were included in the latter investigations.

In the chemical work, quantitive determinations of the dissolved gases, phosporous, nitrates, and hydrogen-ion concentration were made on the 6 lakes from which fish were obtained for growth studies and 2 additional lakes. No noteworthy chemical changes from previous years were observed in these lakes.

A special study of the hydrogen-ion concentration of the water was made in a number of lakes. There was a question regarding the reliability of the pH readings on samples obtained from the deeper

waters of a lake. That is, it was not known whether changes in temperature and hydrostatic pressure due to hauling a sample to the surface from a depth of 25 meters, for example, made any difference in the hydrogen-ion concentration of the water. In order to answer this question, a quinhydrone outfit with a calomel electrode was constructed so that readings could be taken in situ at the various depths. Results obtained with this instrument showed conclusively that hauling a sample to the surface from a depth of 33 meters for the pH determination did not have any appreciable effect upon the hydrogen-ion concentration, even when the sample contained a considerable quantity of free carbon dioxide.

In order to correlate the work on the penetration of solar energy into lake waters with some of the biological phenomena, observations were made on the photosynthetic activities of some phytoplankton algae and on one of the large aquatic plants. These experiments show clearly that the color of the water has an important bearing on the depth at which photosynthesis can take place.

A qualitative and quantative survey of the large aquatic plants was made on 5 of the smaller lakes during the summer and qualitative observations on 11 others. Material was also collected for a study of the ecological anatomy of the plants growing under different soil conditions and this investigation is now in progress.

Phosphate fertilizer was added to the water of Weber Lake in order to determine whether the phytoplankton crop of this lake could be materially increased by this means. This experiment demonstrated that the phosphate content of a lake of this size can be greatly increased during a period of 3 or 4 months at a cost of about $15 for phosphate material.

The plankton crop proved to be a little more than 10 percent larger in 1932 than in 1931; but this small increase can hardly be regarded as significant, especially since some of the other lakes on which regular plankton observations were made, showed larger increases without any phospate treatment whatever.

Plankton observations were made regularly on the six lakes. The average quantity of organic matter in the centrifuge plankton varied from 85 to 140 milligrams per cubic meter of water on a dry basis. The smallest quantity reported, however, was 50 percent larger than in the previous year. From these figures and from the known areas and volumes, the standing crop of plankton per unit of area in various lakes is computed.

Approximately 8,000 fish were collected during the summer for the purpose of studying their rate of growth. The alimentary tracts of 2,500 fish were examined for the purpose of determining the quantity and kinds of food eaten. Approximately 30 percent of the specimens contained no food, thus leaving 70 percent for analysis. The great majority of those containing food consisted of the following: Perch, 796; rock bass, 508; bluegills, 82; ciscoes, 283; and suckers, 99. The remainder consisted of whitefish and various species of game fish.

The internal parasites of 1,823 fish and 64 birds were studied during the summer. A small trematode larva was found in the eyes of 96 percent of the perch and 92 percent of the rock bass from Muskellunge Lake and in all of the perch and rock bass from Nebish Lake. Only 20 percent of the perch and 24 percent of the rock bass from Trout Lake harbored flesh parasites, while these trematode

larvae were found in the flesh of 55 percent of the perch and 94 percent of the rock bass of Muskellunge Lake and in 89 percent of the perch and 100 percent of the rock bass from Nebish Lake. Intestinal trematodes were found in 79 percent of the rock bass of Muskellunge Lake and in 62 percent of those from Trout Lake; only 10 percent of those from Nebish Lake were infested with these parasites. Nematodes, cestodes, and Acanthocephala were present in many of the fish also, but usually not in such a large percentage of them.

OYSTER INVESTIGATIONS

Under the direction of Dr. P. S. Galtsoff, investigations concerning various problems of the oyster industry were carried out in New England and the North Atlantic States (Vineyard Sound, Buzzards Bay, and Long Island Sound); South Atlantic States (Beaufort, N.C., South Carolina, Georgia, and west coast of Florida); and on the Pacific coast in Washington and California. The selection of specific projects of study in different sections of the country was governed both by the local conditions and most urgent needs of the industry. Thus, in New England and the North Atlantic States, where previous work of the Bureau materially helped in the solution of the problem of propagation of the oyster, the main efforts were directed to a study of the methods of growing, fattening, and improvements of the nutritive quality of the oysters. On the other hand, in the South Atlantic States where the depleted state of the natural oyster reefs threatens the existence of the industry, principal attention was given to the methods of restocking and maintaining the productivity of the bottoms. On the Pacific coast the work consisted in studies of the cultivation and development of the native Olympia oyster.

INVESTIGATIONS IN NORTH ATLANTIC STATES

In cooperation with the Shellfish Commission of the State of Connecticut the Bureau has established a field laboratory on State property at Milford, Conn., and planted several thousand bushels of 3-year-old oysters on a 6-acre tract of bottoms in Long Island Sound set aside for that purpose by the Shellfish Commission. Oysters for planting were donated by the Mansfield Co. The authorities of Yale University cooperated in this project by granting to the Bureau's investigator the privilege of using the laboratory facilities of the university. Boats for this work were furnished by the State Shellfish Commission and by the Connecticut Oyster Farms Co.

Since April 1932, field observations at Milford and vicinity have been carried out by V. L. Loosanoff and Dr. P. S. Galtsoff. The results obtained during the 9-month period show that oyster meats undergo important chemical changes. During the early summer the glycogen content gradually decreases reaching a minimum just before spawning. The discharge of eggs and sperm is followed by a considerable loss of solids and corresponding increase in the water content of the meat. During this period, which lasts about 2 weeks, the water content increases from about 75 percent to over 90 percent. It is obvious that during this period the food value of the oysters is very low. The period of spawning is followed by a period of rapid accumulation of glycogen which before the onset of cold weather

reaches a very high figure. On the best grounds oysters analyzed in November contained as much as 9 percent of glycogen (fresh basis). After the temperature of the water drops below 42° F. oysters begin to hibernate; their meat loses weight, although the shells continue to grow and the total weight increases.

Analyses of the metal content (iron and copper) indicate a great variability in the amounts of heavy metals stored by the oysters in different localities and during different seasons. On the basis of the information obtained by the investigators it seems possible to regulate the metal content of the oyster by proper methods of transportation and cultivation.

Food of the oyster.—Changes in the chemical composition of the meats are brought about by seasonal changes in the composition of the sea water and in the natural food of oysters. This problem has been studied by Dr. Galtsoff, Mr. Loosanoff, and Mr. Smith, both in the field and in the laboratory. Large numbers of diatoms which constitute the principal food of the oyster were obtained from the oyster bottoms and were raised in pure cultures under controlled conditions. The experiments give considerable information regarding the methods of propagation of these important forms and their value as a food of the oyster. It is expected that on the basis of these experiments, a method may be found whereby oyster farms could be supplied with the most suitable food for oysters and unproductive oyster bottoms converted into fertile grounds.

Japanese oyster.—During the last year, oyster growers made many inquiries as to the possible effect on the native stock of the importation of the Japanese oyster. In order to answer this important question a series of experiments was performed at Woods Hole by Dr. Galtsoff and R. O. Smith. They show that the Japanese species, *Ostrea gigas*, easily interbreeds with the native oyster, *Ostrea virginica*. It is therefore, obvious that the presence of the Japanese species on the Atlantic coast will result in the interbreeding of the two oysters. It is, however, impossible at present to state whether the resulting hybrids will be in any respect better or worse than the native species.

Control of starfishes.—The work on the control of the starfish by checking its propagation and destroying the young stars by application of copper sulphate solution was carried out in Buzzards and Narragansett Bays by Louise Palmer. After September 1, on account of lack of funds, the project was discontinued. The Bureau, however, is fully aware of the dangerous situation caused by an extraordinary increase in reproduction of this enemy of the oyster. During the last two summers very heavy spawning of starfishes was observed both in Buzzards and Narragansett Bays. It is expected that the oyster beds in these bodies of water will suffer considerable damages from the depredations of this pest.

SOUTH ATLANTIC OYSTER STUDIES

Practical experiments in oyster farming and investigations of conditions on the natural oyster beds were conducted from North Carolina to Florida under the supervision of Dr. H. F. Prytherch. Laboratory and field studies of oyster spawning and setting were made at eight representative coastal stations in this section and at the United States Fisheries Laboratory at Beaufort, N.C., which serves as headquarters

for this work. In cooperation with the various State Shellfish Commissions, oyster farming operations were carried out on a small commercial scale for the purpose of determining and demonstrating the most efficient methods for oyster culture in each particular region. The results of these experiments and field surveys of natural oyster beds are described briefly according to the States in which these operations were conducted.

Experiments in North Carolina, South Carolina, and Georgia.—Oyster spawning occurred almost simultaneously throughout this section during the first week in May or about 2 weeks earlier than in 1931. A fairly heavy set was obtained by June 1 on the various spat-collecting devices planted on the tidal flats. Brush poles, cement-coated paper tubes, and mats were found to be of practical value for gathering seed oysters. The myrtle and oak poles (2 to 4 inches in diameter and 3 to 4 feet long) collected from 75 to 250 seed oysters per pole. On the paper tubes an average yield of 300 seed per tube were obtained while the expanded mat collectors gathered from 500 to 3,000 seed oysters each. By the use of poles and tubes it is possible to utilize thousands of acres of barren mud bottoms for collecting and growing seed oysters. The mat collectors proved to be particularly suitable for planting over oyster beds or on shell bottoms and are so designed as to prevent crowding of the seed, allow ample room for growth, and eliminate the detachment operations required by other types of collectors. In several localities plantings of seed oysters and shells were made to demonstrate these phases of oyster farming and show the value of such methods for the rehabilitation of barren bottoms and natural oyster beds.

At the Beaufort laboratory, research was continued on the problem of improvement in oyster-shucking methods and the preparation of this sea food for market.

In the marketing of oysters the raw-shucking trade is of greatest importance both as regards the quantity of oysters handled and number of persons employed. At the present time approximately 60 percent of oysters produced for the fresh trade are shucked before marketing. The total quantity of oysters marketed raw amounts annually to nearly 5,500,000 gallons for which it is estimated over $1,500,000 are expended each year for shucking alone.

Experiments conducted by Drs. Vera Koehring and H. F. Prytherch, dealing particularly with this phase of the industry, show that oysters can be easily narcotized by chemical means so as to produce automatic opening of the shell and facilitate removal of the meats. The preliminary studies and fundamental aspects of this process are described in Investigational Report No. 15 of the Bureau of Fisheries.

Subsequent research has shown that oysters receiving mechanical stimulation previous to their immersion in the narcotizing solution will be open and ready for shucking in but a fraction of the time required previously. By simple mechanical procedures, such as dropping the oysters on a hard surface or hitting the shell a single sharp blow, it has been possible in numerous experiments to completely narcotize 100 percent of the oysters in a period of from 10 to 30 minutes. This has greatly increased the practical value of such opening operations as from 6 to 12 hours were required previously to accomplish the same results. This improvement in the method makes it from 30 to 50 percent cheaper as a smaller amount of acid is employed and the

narcotizing solution can be used for several consecutive batches of oysters.

Oyster investigations in Florida—Three surveys were made by Dr. Prytherch of the oyster beds and condition of the industry in Apalachicola Bay and Choctawhatchee Bay on the west coast of Florida. Examinations of 11 of the most important bars in the former locality in January showed no evidence of depletion and an abundant supply of seed and adult oysters. Overcrowding of oysters was evident on most of the natural bars which should be corrected by transplanting a certain proportion of the culled or undersized oysters to adjacent firm bottoms where better conditions for feeding and growth are available. In the fall serious destruction of oysters was reported in St. George Sound on the natural and planted beds in the vicinity of Porters Bar. Studies made there in November showed that 50 to 75 percent of the oysters had been killed by a parasitic flatworm or so-called "leech." From 1 to 4 flatworms were found in each affected living oyster or in the empty shells of recently killed specimens. Similar outbreaks of this parasite have occurred previously at Tampa, Cedar Keys, and Indian River Inlet during dry warm seasons and similar conditions were apparently responsible for the high mortality of oysters in St. George Sound.

A new and promising territory for the production and cultivation of oysters was found in Choctawhatchee Bay. The recent formation of a new inlet to the Gulf of Mexico has greatly increased the salinity of the water and produced excellent conditions for oyster growth and reproduction. Experimental plantings of seed oysters and shells will be made here during the summer of 1933 to determine the most practical measures for increasing the production of the natural beds and the development of oyster culture on barren bottoms.

PACIFIC COAST OYSTER STUDIES

Oyster investigations in the State of Washington.—The experimental study of the cultivation of Olympia oysters, begun in 1931, in cooperation with the Washington State Department of Fisheries and Game, was continued during this year.

An intensive study is being made of the spawning and setting of larvae in the two most important oyster producing bays in the Olympia region. For this purpose, wire bags filled with large shells were planted twice a week in certain typical dikes. Each bag of shells was allowed to remain in the water 7 days, when it was brought into the laboratory and counts made of the number of spat which had been caught. In Oyster Bay the setting season may be divided distinctly into two parts. The first setting period began on June 26, reached its peak on July 5, and ended about July 25, at which time a second setting period started. The peak of this period was reached on August 25 and setting practically ceased by August 31. From this time until the middle of October, periods of constantly decreasing abundance of setting occurred. At the peak of the first set, something over 6,000 spat per day per bag of shells were taken, while at the peak of the second set, approximately 7,500 were caught. Oyster grounds down the bay from the great mass of oyster beds gave results entirely similar, except that the total set was only about one fifth as great as that above described.

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For some reason, in Mud Bay the results obtained were entirely different, although the conditions of salinity and temperature in the two bays differ only very slightly. In Mud Bay there were four relatively small waves of setting. The duration of these was as follows: (1) July 6 to 23, (2) July 24 to August 5, (3) August 13 to 23, and (4) August 24 to 30. In the same order, the number of spat obtained per bag of shells during the peak of each of these periods was: 1,500, 1,200, 500, and 400. While in Oyster Bay the larvae continued setting up until about the middle of October, in Mud Bay after the first of September practically no further set was obtained. The method of planting cultch at present employed by the oyster growers is apparently based on the assumption that only one setting period normally occurs, for cultch is always planted in June. During two seasons it has been found that in Oyster Bay the second period of setting taking place in August is as great as the first. It has been suggested that oyster growers attempt to take advantage of the second as well.

A new type of spat collector, a modification of the common egg-crate filler, which provides a large amount of horizontal surface, was put into commercial use during the season. These apparently were highly successful and in every case obtained a most excellent catch of spat.

Preliminary experiments were made to determine at what tides larvae set most abundantly. It appears to be a common opinion that the water most favorable for setting is that retained in the dikes at low tide. By planting glass plates for periods of a few hours at a time, it was shown that less spat are caught at low tide than at any other time, that setting takes place primarily on the flood and high tides when the water is from 8 to 10 feet deep. Further tests will be made on this matter next season to clear it up more thoroughly.

An experimental study of the effect of temperature on the feeding of the Japanese oyster was made. It was found that the rate at which the oyster pumps water depends upon the degree of openness of the shells, that the shells are themselves dependent upon temperature and remain open widest at a temperature of approximately 20°C. The gills seem to pump most rapidly at a temperature above 25°. However, as the temperature rises above 20°, the shells tend to close more and more, reducing the effectiveness of gill activity. More water is pumped by the average oyster at 20° than at any temperature either above or below. Apparently the Japanese oyster can pump water at a temperature as low as 2°C.

Oyster investigations in California.—At the request of the State Division of Fish and Game, H. C. McMillin has been detailed to assist the State authorities in developing the California oyster industry. At present extensive areas of inshore waters in California remain barren while the oysters are shipped in from the east coast or from the State of Washington. Small areas in San Francisco and Tomales Bay have been used for some time to hold imported oysters until they were marketed, but no attempts have been made until recently to cultivate and grow oyster seed.

Three species of oysters are available for use in California waters: The native oyster (*O. lurida*) found in natural beds in many small channels; the eastern oyster (*O. virginica*) transplanted from the Atlantic coast; and the seed of the Japanese oyster (*O. gigas*) imported

and grown to maturity in some bays. The seed of the last two species is accompanied by other forms which become troublesome pests, but with due precaution it is possible to cultivate these oysters safely in isolated areas.

The results of the investigation show that local conditions seem to warrant the development of the native oyster industry to the fullest extent. It is, however, imperative that the cultivation of oysters in any one bay be limited to a single species as far as possible. Thus the Japanese oyster can be grown on ground that is otherwise useless. Eastern oysters can be planted in San Francisco, and Tomales Bays, and Elkhorn Slough. In the latter locality seed oysters strung on ropes and suspended from floats grow twice as fast as in their normal habitat.

Small beds of the native oyster occur in the larger bays of northern California and in all bays and estuaries in southern California. They have been of little commercial value prior to the present investigation and the residents of the communities near the natural beds were unaware of their existence. During the past year extensive experiments have been undertaken, mostly in Humboldt Bay, and a method of culture by the use of artificial beds has been worked out. Small areas of barren tide flats in suitable locations are leveled, covered with gravel or shell, and surrounded by a board wall which holds about 2 inches of water on the bed at low tide. Seed oysters and shell are taken from the crowded natural reefs and transplanted to these beds where the size, shape, and meat content is greatly improved. It has also been demonstrated that the artificial beds catch a good crop of seed, and it is therefore probable that nearly 7,000 acres of tide lands in Humboldt Bay can be brought under intensive cultivation. Native oysters have, heretofore, consistently sold for the highest price of any oyster on the market, and the growers have rarely been able to fill their orders completely.

INVESTIGATIONS IN AQUICULTURE

Investigations in fish culture and related problems were carried on along much the same lines as in 1931. These investigations which are under the direction of Dr. H. S. Davis necessarily cover a wide field since they include studies relating to all phases of fish-cultural activities. While the work in the past has been primarily concerned with problems connected with hatchery operations increased attention is now being paid to the welfare of the fish after being liberated. This is fully as important as efficient methods of rearing fish since in order to utilize these fish to best advantage they must be surrounded by conditions conducive to their future development and well-being. It is apparent that in many cases much can be done to improve conditions in our lakes and streams so that they will be able to support much larger numbers of fish than at present. This is a problem to which relatively little attention has been paid in America, although in Great Britain and other European countries the importance of stream conditioning has long been recognized and notable success has attended its practical application, especially to trout streams. Stream improvement is a field that offers great possibilities for the future, but permanent progress must go hand in hand with years of painstaking research.

POND-FISH CULTURE

FAIRPORT STATION

The work of this station, which is under the direction of Dr. A. H. Wiebe, is devoted entirely to problems relating to pond culture. The main water supply is pumped from the Mississippi River into a reservoir whence it flows by gravity to the ponds. There is also a limited supply of well water which can be used in several of the smaller ponds. The entire pond system, comprising 24 dirt ponds of various sizes up to 3½ acres, is available for experimental work. In addition there are a number of concrete pools and indoor tanks and aquaria which are used for investigations requiring carefully controlled experiments.

Largemouth bass.—As in previous years, the pond experiments have been concerned primarily with largemouth bass although other species have received considerable attention. Owing to serious infestation of the brood bass with the tapeworm *Proteocephalus ambloplitis* the production of fry was much less than in previous years and it was consequently impossible to stock some of the ponds as heavily as planned.

Although experience has shown that the use of nursery ponds to which the bass fry can be removed and reared during the summer affords many advantages, there is increasing evidence that good results can frequently be obtained when the young are reared in ponds in which they were hatched. The greatest objection to this method is the fact that the fish are less under control, and there is no way of determining if the pond is properly stocked with fry. Nevertheless, very satisfactory results can be obtained with this method as shown by the results in a pond of 0.71 acres stocked May 4 with 3 male and 4 female largemouth bass, and 568 adult golden shiners for forage. The pond was given no further attention except that it was fertilized with 283 pounds of a mixture of dry sheep manure and superphosphate. This was applied in small amounts at intervals of about 10 days. The pond was drained September 8 and 7,376 fingerlings removed which is at the rate of 10,400 per acre. This is believed to be a very satisfactory yield since very little labor is required to produce fish by this method.

Smallmouth bass.—Although conditions at Fairport are quite different from those usually thought to be necessary for the culture of smallmouth bass a small stock of brood fish has been maintained for several years and the production of fingerlings has been fully equal to that of the largemouth. The fry and fingerlings are handled in the same way and reared in nursery ponds stocked with forage fish. In an attempt to determine the relative value of blackhead and blunt-nosed minnows for forage purposes two nursery ponds, with an area of 0.359 and 0.39 acres, respectively, were stocked with smallmouth fry at the rate of 25,000 per acre. Blackhead minnows were used for forage in one pond and blunt-nosed minnows in the other. The number of minnows in each pond was at the rate of 1,500 adults per acre. In all other respects the treatment of the two ponds was identical. When drained the first week in October the pond stocked with blackhead minnows yielded 12,282 fingerlings per acre, a survival of 49.3 percent, while the production in the one stocked with blunt-nosed minnows was at

the rate of 11,579 fingerlings per acre or a survival of 46.2 percent. The results indicate, as anticipated, that the blackhead and blunt-nosed minnows are equally valuable as forage fish.

Crappie and bluegill sunfish.—It has been found that crappie and bluegill sunfish make a very satisfactory combination, the production of crappie fingerlings being somewhat greater than when the pond is stocked with crappie alone. The young bluegills are evidently preyed upon by the crappie since only a comparatively small number of fingerlings of this species are produced under such conditions. This being the case it appeared that the production of bluegills might be increased by the use of minnows. Accordingly a pond was stocked with adult black crappie and bluegills as usual and in addition 12,000 blackhead minnows were placed in the pond to serve as forage. The yield from the pond was 19,164 crappie and 22,680 bluegills per acre, with a combined weight of 115 pounds. In 1931 the same combination without the blackhead minnows gave 20,562 crappie and 1,430 bluegills per acre. It is evident that the addition of forage minnows increased the yield of bluegill sunfish without materially affecting the number of crappie.

Effect of high-oxygen concentrations.—Dr. Wiebe has continued his experiments on the effects of high concentrations of dissolved oxygen, using brook and rainbow trout of various sizes. The results of these experiments are in full accord with those previously obtained with bass and other pond fish.

It was found that trout can withstand rapid changes from low to high concentrations of oxygen without injury. In some instances the fish were exposed to oxygen at from 10 to 20 pounds pressure for 46 hours without suffering any injurious effects. Even when suddenly transferred from water containing 51.8 parts per million of oxygen to water with an oxygen content of only 8.4 parts per million the fish showed only momentary signs of distress and no after effects were evident.

In another experiment brook and rainbow trout fingerlings were kept for 20 days in open tanks containing water supersaturated with oxygen. During this period the concentration of oxygen ranged from 21 to 33 parts per million and at no time was the saturation below 200 percent. The fish all survived the experiment and there was no evidence that they were affected adversely by the high-oxygen concentration. No case of gas bubbles or popeye was observed although the fish were watched carefully for these symptoms.

Experiments on the ability of fish to use oxygen at different hydrogen-ion concentrations show that largemouth and smallmouth black bass, green sunfish, crappie, yellow perch, and rainbow trout have the ability to extract oxygen from the water at low-oxygen tensions equally well over a wide range of hydrogen-ion concentrations. The bluegill sunfish has a somewhat narrower range of toleration while in the steel colored and blunt-nosed minnows the range is much more limited. Outside of the normal pH range of the species in question the lethal-oxygen tension is dependent in large measure on the initial amount of oxygen in solution.

Rate of digestion in bass.—A series of experiments by H. C. Markus to determine the rate of digestion in largemouth black bass at various temperatures gave some very interesting results. It was found that

the length of time required to digest minnows varied from 15 days at a temperature of 4° C. to 12 hours at 28° C. At 10° C. 92 hours were required for digestion while at 22° C. the food was completely digested after 16 to 22 hours. The fish would not take food satisfactorily at a temperature below 10° C., and it is apparent that bass require very little food at these low temperatures.

TISHOMINGO (OKLA.) STATION

Investigations on certain phases of pond culture were carried on at this station by O. Lloyd Meehean during the summer of 1932. The ponds at Tishomingo are all new and are supplied with water from a creek flowing through the station grounds.

Experiments with *Daphnia magna* showed that this organism can be reared successfully at the station if the temperature remains below 20° C. On the approach of hot weather the daphnia cultures deteriorated, and it was found impossible to keep them up during the summer. The daphnia were reared in concrete pools using dry sheep manure and superphosphate as a fertilizer. Some preliminary experiments on a small scale indicate that cottonseed meal will prove fully as valuable as sheep manure or soybean meal for rearing daphnia.

Routine collections of chemical and biological samples were made in the station ponds to determine as far as possible the conditions in each pond. The chemical data show that there is a large reservoir of carbon dioxide in a half-bound state which can be utilized for the growth of phytoplankton. The data also show the necessity for the control of the rooted aquatics in order to keep the carbon dioxide supply in an available condition. In most ponds the zoo-plankton was not abundant and in several cases it was very poor. In practically all instances the plankton decreased as the summer progressed and the amount of rooted vegetation increased. It is significant that in ponds with small amounts of vegetation Cladocera were abundant while in ponds with an abundant growth of rooted plants rotifers and Cyclops were the dominant organisms.

HACKETTSTOWN (N.J.) STATION

A cooperative experiment in rearing smallmouth black bass was carried on at the New Jersey State hatchery at Hackettstown by A. M. McGavock. The primary purpose of the experiment was to determine the most efficient and economical way to produce daphnia for feeding young bass. In one case the daphnia were cultured in a separate pond while in the other experiments the daphnia were grown in the same ponds as the fish. The latter method was used in a pond with an area 0.63 acre, which was fertilized with approximately 8,000 pounds of fresh horse and cow manure in addition to about 2 inches of trout excrement. As a result there was a very abundant growth of plankton and bottom organisms in the pond during the summer. The pond was stocked June 11 with bass fry at the rate of 25,000 per acre. It was drained September 8 and yielded 8,178 fingerlings averaging 6.48 grams in weight, a survival of 51.8 percent. This is a return of 12,990 fingerlings per acre. The total cost of labor and manure was $174.30 or $13.40 per thousand fish.

In another pond of approximately the same size daphnia were cultured from trout excrement produced by fifteen thousand 8- to 10-inch

fish which were wintered in the pond for 8 months. The pond was stocked June 14 with smallmouth fry at the rate of 22,130 per acre. When drained September 13, 5,480 fingerlings were removed with an average weight of 9,130 grams. This gives a return of 41 percent or 9,130 per acre. The total cost was entirely for labor at the rate of $50 per acre, or $5.47 per thousand fingerlings. Although the number of fish produced was somewhat smaller by this method the bass were larger and the cost of production much less.

In another experiment the daphnia were cultured in a separate pond, then flowed or netted over into the main pond. The total area including the daphnia pond was 0.69 acre. A total of 8,760 pounds of fresh horse and cow manure was used in addition to about 2 inches of trout excrement. The pond was stocked June 9 with smallmouth fry at the rate of 25,000 per acre. It was drained September 9 and yielded 8,609 fingerlings with an average weight of 3.23 grams. This gives a return of 49.8 percent at the rate of 12,475 fingerlings per acre. It should be noted, however, that these fish were only one half the size of those in the other ponds. The total cost of labor and manure was $12.40 per thousand fingerlings.

It is evident from these experiments that smallmouth bass fingerlings 3 to 4 inches long can be economically produced in heavily fertilized ponds without the use of forage minnows. They also indicate that the construction of separate ponds for the production of daphnia are not necessary. As a matter of fact the pond supplied with daphnia from another pond gave the poorest results of the three, but of course no general conclusion can be drawn from such a small number of experimental ponds.

TROUT CULTURE

Feeding experiments.—During the summer of 1932 feeding experiments were conducted at the Pittsford (Vt.) station under the direction of R. F. Lord as in previous years. Fish were also carried on experimental diets at the new hatchery at Leetown, W.Va., under the direction of E. W. Surber. Unlike the experiments at Pittsford those at Leetown will be continued through the winter. At Pittsford brook trout were used in most of the experiments with fingerlings, while at Leetown the majority of the experimental lots contained rainbow and brown trout. Experiments with yearling rainbow trout in out-door raceways were also carried on at Pittsford.

As in previous experiments, dry salmon-egg meal proved to be superior to any dry product now available for fish food. All diets containing this product gave a very rapid growth and the fish were exceptionally vigorous and well proportioned. As emphasized in previous reports they also exhibit the brilliant coloration characteristic of wild fish. These experiments show conclusively that the use of the better dry products in the diet of trout will give better results, both as regards growth and vigor, than can be obtained with any of the straight meat diets. Furthermore, they are in general more economical, since it requires a considerably smaller amount of food to produce the same growth when animal meals are included in the diet.

The results of the experiments with yearling rainbow trout agree closely with those obtained with fingerling brook trout. In most

cases a somewhat smaller amount of food was required to produce the same growth than with fingerlings, but this is probably caused by the fact that there is less waste in feeding larger fish. For the same reason larger amounts of dry foods can be included in the diets after the fish reach a length of 4 to 5 inches.

A number of experiments were undertaken at Leetown in cooperation with the Birdseye Laboratories, Gloucester, Mass., in feeding dry meals prepared by a special low-temperature process to rainbow trout fingerlings with and without the addition of fresh meat. Two dry meals were used in these experiments; one being composed of a mixture of meat meal, fish meal, and dried skim milk; the other had a similar composition except that it contained a considerable amount of dried beef liver. Each of these meals was fed to 3 lots of fish for over 8 months without the addition of any fresh meat or other food. One lot was fed meal which had been prepared before the experiments were started and stored in air. The second lot was fed meal which had been stored in carbon dioxide, while the third lot received meal prepared fresh each month and likewise stored in carbon dioxide. The losses were not excessive in any lot, but were noticeably less in those receiving meal stored in carbon dioxide. There was little difference in the mortality of the fish fed the meal stored in carbon dioxide from the beginning of the experiment and those receiving that prepared fresh each month. The growth of fish fed meal containing dry beef liver was slightly less, but there was very little difference in the mortality of the fish on the two meals.

Two lots of fish fed dry haddock roe prepared by the same process made a good growth with very little mortality. The growth on haddock roe was much superior to that obtained with the meals and the fish showed an even more brilliant coloration than those on a salmon-egg meal and liver diet.

It is evident from these experiments that trout are able to live indefinitely on dry foods when properly prepared. In no case, however, did the fish on an exclusively dry diet grow as rapidly as those fed salmon and liver. The haddock roe was not fed in combination with liver, but both of the meals produced a considerably greater growth when mixed with 20 to 40 percent of beef liver. Even then, however, the growth was inferior to that obtained with diets containing salmon-egg meal.

Selective breeding.—The work on selective breeding has been continued at Pittsford along the same lines as in previous years. So far the work has been confined to brook trout, but the results have been so encouraging that it is planned to expand it to include rainbow and brown trout. Most of the breeding work with these two species will be carried on at the Leetown station, where several thousand brook, rainbow, and brown trout are now being reared to maturity. During the fall of 1932 eggs were taken from 51 pairs of selected fish at Pittsford and the young will be kept separate until next fall when the inferior lots will be discarded. So far in these experiments special attention has been paid to rapidity of growth, vigor, and fecundity. The results attained have been remarkable considering the short time the work has been carried on.

Fingerlings reared in these experiments during the past summer represent the third generation of selected fish and many lots made a much greater growth than did the fingerlings from the general brood

stock such as were used in the feeding experiments. The lot making the greatest growth of those on experimental diets had an average individual weight of 6.09 grams on September 3, while one lot of selected fish on the same diet had an average weight of 12.7 grams on September 7. Another lot had an average weight of 12 grams and several lots averaged 10 grams or more. These results are the more striking when it is considered that the general brood stock has been improved by mass selection during this time, so that the average weight of fingerlings kept on a diet of beef liver during the summer has increased from 2.2 to 4.4 grams.

The increase in egg production as a result of selective breeding is equally gratifying. The average number of eggs produced at the end of the third summer (that is, by fish commonly known as 2-year-olds) was 958 in 1928 and 1,779 in 1932. These fish were selected as the best available fish of their age.

Additional data, showing the importance of heredity in determining the date at which trout spawn, was obtained during 1932. In one lot of fish containing thirty-eight 2-year-old females 33 were ready to spawn on November 8. The eggs from which these fish were hatched were taken November 9, 1929. In another lot containing 28 females, 25 fish were ripe November 8. The spawning date of the parents of these fish was November 8, 1929. In several other lots the results were nearly as striking.

Evidence was also obtained indicating that it will be possible to develop a strain of brook trout more resistant to furunculosis than the average fish of this species. Two lots of fish hatched in 1930 from mated pairs have shown a marked resistance to the disease, the percentage of survivors being much greater than in any other lots. Owing to the fact that it is very difficult to eradicate furunculosis after it has become established at a hatchery, the development of a resistant strain of fish offers one of the most promising means of combatting the disease.

Observations on recently liberated trout.—The belief appears to be increasing among anglers and others that trout reared at hatcheries are inferior to wild fish in several respects, and especially in their ability to forage for themselves. This may be true to a certain extent, but there is little definite information on which to base an opinion. In order to throw more light on this problem 100 yearling brook trout, averaging 7 to 8 inches in length, were liberated in a trout brook running through the grounds of the Pittsford station. These fish were marked by removal of a pelvic fin and liberated on August 18 shortly after the close of the fishing season. Up to the time of their liberation these fish had been held in one of the hatchery pools, with concrete sides and gravel bottom. They had been fed the regular hatchery diet of dry salmon eggs and liver, and were vigorous well-proportioned fish. Beginning 24 hours after the fish were liberated daily samples were taken on artificial flies and the stomachs preserved for study.

It was found that these trout took the fly with the same zest displayed by other fish taken in the course of the study and apparently gave the anglers as much "fight" as fish reared in natural surroundings. As in the case of the wild fish, it was found impossible to inveigle any of the hatchery trout into taking the fly on certain days, and it was concluded that they were not appreciably easier to capture than wild trout.

An examination of the stomach contents showed that in spite of the fact that these trout had been reared solely on artificial food they began to take natural food shortly after being liberated. The stomachs of fish caught the following day were filled with insects of various kinds showing that they were on the alert for natural food from the start. It was found that, in general, there was a slight increase in the amount of food eaten during the first 3 days but that after that there was little difference from day to day and that the amount of food taken was approximately the same as by wild fish. It would appear from this experiment that hatchery fish are fully able to forage for themselves as soon as liberated. Owing to the great importance of this problem further experiments along the same line will be undertaken in the near future.

Several experiments for the purpose of gaining information regarding the behavior of fingerling trout when first liberated were carried out at the Leetown station. Fingerling rainbow, brook, and brown trout were liberated in a small spring-fed stream and their movements carefully watched. The fish all showed a marked tendency to move in schools for several days at least after being liberated. A general tendency was noted for the fish to remain for some time in the pools in which they had been planted although there was a gradual dispersal along the stream. In this dispersal the rainbow trout moved more quickly downstream than upstream while the opposite was true of brook and brown trout.

In all cases the fish began taking food almost immediately after being liberated and examination of the stomach contents showed they were feeding on aquatic insects and crustacea. There was no evidence that the hatchery-reared fish were not able to capture these organisms as readily as wild trout. A marked increase in the brilliancy of the coloration was noticed within 2 weeks after the fish were liberated.

CALIFORNIA TROUT INVESTIGATIONS

Work on problems relating to the trout of California has been vigorously pursued during the past year. Early in July Dr. H. S. Davis and Dr. P. R. Needham were sent to California and in company with A. C. Taft made an extensive survey of the better fishing areas of the State with a view toward the development of a more intensive program of field investigations. At a conference held in San Francisco with the officials of the California Division of Fish and Game a new joint cooperative program was adopted which provides a comprehensive plan of study to be followed over a period of years. Dr. Davis returned to Washington in late August and the field staff now consists of Dr. Needham and Mr. Taft of this Bureau and two assistants, Leo Shapovalov and Francis Sumner, who were appointed to the work by the State.

Briefly, the program as now set up consists in attacking the trout problems of California from two angles; viz, a study of the trout and a study of their natural environment. The data obtained in these investigations will be utilized in the formulation of a scientific stocking policy for the waters of the State. The major projects selected for study are as follows:

1. A study of the species and races of trout to obtain as complete information as possible on the life history, habits, and ecological requirements.

2. The extent of natural propagation and its contribution toward stream populations.

3. Mortality of fish of various sizes when planted in the streams from the hatcheries.

4. Stream environmental studies to determine: (1) Seasonal abundance and distribution of fish foods; (2) the amount and kinds of shelter available for both young and adult trout; (3) effects of dams, falls, irrigation ditches, flumes, water wheels, etc.; and (4) chemical conditions such as gases in solution, hydrogen-ion concentration, and pollution.

For purposes of investigation the waters of the State may roughly be classified in three groups: (1) Southern region, (2) coastal region, and (3) Sierra region. The last-named region can be subdivided into a lower Sierra region, the waters of which are best adapted to rainbow and brown trout, and a high Sierra region containing waters best suited to golden and eastern brook trout.

The bulk of the work on streams of the coastal region has been carried on in Scott and Waddell Creeks in Santa Cruz County and to a lesser extent in the Klamath River and Alder and Garcia Creeks north of San Francisco. In the Sierra region the Truckee and Feather Rivers and Blackwood and Taylor Creeks near Lake Tahoe have received considerable attention. Next summer work is to be started on the golden trout of the high Sierras in the Cottonwood Lakes district near Mount Whitney. New studies will also be undertaken in the Merced and Tuolumne Rivers in the lower Sierra region. A knowledge of conditions in the trout waters of the State throughout the year is essential for the development of a scientific stocking policy and as far as possible seasonal studies will be carried on in all these regions.

Much information has already been obtained from studies of sea-run steelhead trout based on marking experiments with young fish and returned spawners and also from periodical samples taken in several coastal streams. In October 40,000 fingerling rainbow trout from two different lots of fish were marked and released into the Truckee River for studies on their migratory habits. The experimental ponds constructed on Hot Creek in Mono County were operated during the summer for the study of growth rates and mortalities of fingerling rainbow trout on natural food.

Quantitative food samples taken in Sierra streams near Lake Tahoe have shown riffle areas to average approximately 137 pounds of food per acre. Waddell Creek, a coastal stream, was found to produce nearly the same amount giving an average of 132 pounds per acre. The dominant food organisms in all stream bottom samples taken thus far have been caddis larvae and pupae, mayfly nymphs, and and aquatic Diptera. The lagoons at the mouths of coastal streams have been found to be exceptionally rich in both amphipod and isopod crustaceans and consequently afford fine feeding grounds for young trout.

FISH DISEASES

Routine investigations have been carried on in connection with several trout diseases whenever there was an opportunity. Although most of the common trout diseases have been studied by various

investigators there is still much to be learned regarding even the best-known disease which will be of great assistance in developing more effective methods of control. Requests for the diagnosis of diseased fish are constantly increasing and considerable time is spent in the routine examination of specimens sent to the Washington office for this purpose. The constantly increasing demand for large trout for stocking purposes has resulted in a more complete realization of the importance of disease in fish-cultural practice. The control of disease is now recognized as one of the most important problems confronting the fish culturist, since the output of his hatchery depends to a very large degree on his success in keeping the fish free from infection.

In view of the importance of this problem a program has been worked out whereby members of the aquicultural staff make occasional visits to hatcheries located within a reasonable distance, for the purpose of detecting the presence of disease and also to furnish advice and assistance in every way possible. Unfortunately, owing to decreased appropriations it was necessary to practically discontinue this service after several months, but enough was accomplished in the brief time it was in operation to demonstrate clearly its value in increasing hatchery production.

Dr. Frederic F. Fish spent some time at the Fairport (Iowa) station investigating the bass tapeworm with which the brood fish have become heavily infested. It is evident that this parasite constitutes a problem of major importance in bass culture since, when abundant, it seriously interferes with reproduction and may cause practical sterilization of the brood fish. It is believed, however, that by exercising proper precautions it will be possible to prevent the young bass from being infected and in this way a brood stock can be built up which will be free from the parasite. It is very evident that under present conditions it is impractical to rely on wild fish for brood stock and that the future success of bass culture depends on hatchery-reared brood fish free from parasites and disease.

Experiments are being conducted with the object of developing a method of treating trout in pools for external parasites. At present when fish in pools contract gill disease or become infected with protozoan parasites it is necessary to remove them for treatment. It is believed that by the use of very dilute solutions it will be possible to cure the fish while still in the pools and thus avoid the injurious effects of handling which usually result in considerable mortality. If a successful method of treating the fish can be worked out it will remove the most serious objection to the use of pools or raceways for rearing small fingerlings.

COOPERATIVE STUDIES OF THE NUTRITIONAL REQUIREMENTS OF TROUT

During the past summer an agreement was executed between the United States Bureau of Fisheries, the New York State Conservation Department, and the New York College of Agriculture at Cornell University for the purpose of conducting on a cooperative basis experimental studies in fish culture relating especially to fundamental problems of nutrition and physiology of fishes. Complementing, and to a certain degree paralleling, studies of fish-feeding conducted at the Bureau's experimental fish-culture stations, the new undertaking

has been designed to deal particularly with the digestibility of various nutrients by trout, the vitamin requirements essential to an economical and successful ration, and with enzymotic and other physiological and metabolism studies.

These investigations, under the direction of Dr. C. M. McCay of the animal nutritional laboratory at Cornell University, are being conducted in the Bureau's hatchery near Cortland, N.Y. The Bureau is furnishing suitable hatchery facilities, including the hatchery building and such rearing ponds as are needed, the stock of eggs, and part of the feeds necessary for rearing fish. The New York State Conservation Department is providing the necessary funds for the compensation of the technical assistants involved in this work and for special apparatus and feeds needed for the experiments. The State College of Agriculture provides necessary laboratory facilities at Cornell University for experimental work and analyses not readily conducted on the hatchery premises.

Preliminary feeding experiments with brook trout were started at the Cortland experimental hatchery during the month of August and are being run by A. V. Tunison, who was formerly in charge of similar work in Connecticut. Because of the late start of this work, it seemed judicious to limit the scope of experimentation during the balance of the growing season chiefly to a comparative study of the growth of brook-trout fingerlings fed diets composed of various dry foods in conjunction with various raw meats.

Between 30 and 40 different diets were chosen for these preliminary studies. These were composed chiefly of the dry foods which proved to be most promising during the past five years of similar research carried on by Dr. McCay in Connecticut. However, during the present studies the tests were made more rigid than formerly by including only foodstuffs of which the origin and processing are known. A series of dry skim milks made by different methods has been included in the testing.

Certain tentative conclusions may be drawn from the first four months of this work. The better grades of dry skim milk have all proved satisfactory when fed in a mixture composed of equal parts of prime cottonseed meal and fresh meat. Dry buttermilk can replace the dry skim milk and peanut meal may replace the cottonseed meal without affecting the growth of the experimental animals. The fresh meats used in these diets were sheep liver, sheep heart, and beef spleen. Lots of 200 fingerling brook trout grew equally well on these combinations.

No significant difference was found in the growth curves obtained from fingerling brook trout fed dry foods mixed in a 2 to 1 proportion with fresh sheep plucks and trout fed entirely sheep plucks.

Confirmation was made of Dr. McCay's previous findings that trout cannot be maintained indefinitely upon a diet supplemented by meat, such as commercial scrap meat, dried at the usual high temperature and exposed in air in the course of drying. Confirmation was likewise made of the fact that dry skim milk or dry buttermilk will not promote normal growth of brook trout for a period exceeding 14 to 16 weeks.

Good growth was obtained with fingerling brook trout that were fed daily dry feed mixtures containing dry skim milk, 2 parts; cottonseed meal, 2 parts; and whitefish meal, 2 parts, with supplements

of raw sheep plucks 1 part fed at weekly intervals. Thus far, in a period of over 3 months, the growth of the trout fed fresh meat weekly was equal to that obtained by feeding the same dry diet containing an equivalent amount of meat fed daily. By weighing the feed every effort was made to allow the same amount of raw meat to both groups. Contrary to the common belief, no untoward effects were noticeable in brook-trout fingerlings fed for 16 weeks on a straight raw-spleen diet.

Several experiments have not progressed sufficiently at the present time to justify drawing conclusions. Among the incompleted experiments are grouped the comparative growth of brook- rainbow- and brown-trout fingerlings on a standard adequate diet, and the possible relationship existing between underfeeding and the resulting slow growth upon the firmness of trout flesh. Experiments are also in progress to determine if the melting point of a fat determines its degree of utilization by fish.

The use of formalin-preserved meats as substitutes for fresh meat in localities where the latter is not easily available is also under investigation. Fresh ground sheep plucks preserved in 1 percent formaldehyde seem to be as effective as fresh meat in supplementing dry diets.

LIMNOLOGICAL INVESTIGATIONS IN THE ROCKY MOUNTAIN REGION IN THE INTEREST OF FISH STOCKING

During the season of 1932 investigations of the waters of this region under the direction of Dr. A. S. Hazzard were continued in the interest of wiser and more economical distribution of the output of Federal hatcheries. Cooperation in this problem was also extended to the States of Montana, Idaho, and Utah, although most of the work was concentrated in the national parks and national forests. The extension of highway travel and the rapid increase in the number of anglers have necessitated radical changes in methods of planting and have demonstrated the necessity for systematic stocking based upon accurate knowledge of conditions for fish life existing in the more accessible lakes and streams.

Since the Bureau's responsibility for maintaining and improving angling is definitely indicated in the waters of the national parks and national forests, limnological investigations have been concentrated in these areas.

SURVEYS IN THE NATIONAL PARKS AND NATIONAL FORESTS

Grand Teton Park.—A program of biological surveys of the national parks was initiated in 1931 by a study of the lakes and streams of Grand Teton Park, Wyo. In this newly established park little stocking had been done prior to 1931. This, together with increased fishing, resulted in a condition of depletion which called for immediate attention. Survey of these waters revealed marked scarcity of suitable spawning grounds which explained the rapid deterioration in angling resulting from heavy fishing and inadequate planting. Rearing ponds were constructed here during the summer of 1932 and plantings of good-sized fingerlings were made that season in accordance with the findings of the survey relative to suitability for various species and carrying capacity as determined from these studies. It will of course require several years for the results of the stocking

plan to become apparent. Much valuable information is anticipated which should assist in planting lakes of these types.

During September 1932 an opportunity was afforded to complete the survey of Jackson Lake, a United States reclamation project. Although not included within its present boundaries, this reservoir is logically associated through drainage relations with the waters of Teton Park. Studies of the chemistry and food supply this season supplement the data gathered during the summer of 1931.

Glacier National Park.—A biological survey of this, the third largest national park, was begun during the season of 1932. Glacier Park includes 1,534 square miles of picturesque mountain scenery in northwestern Montana. In this area are several hundred lakes and numerous streams varying greatly in altitude, size, depth, temperature, chemistry, and food supply. Under such conditions it might be expected that many problems should arise from attempts to properly stock these waters, the great majority of which were originally barren of all fish life. Some have remained so in spite of attempts to introduce various species. Efforts to improve certain streams by planting have been unsuccessful. In one lake fishing is unsurpassed; in another plantings have met with poor success. Stocking records show that encouragement of a certain species in one lake has not increased its numbers perceptibly while another species has become abundant chiefly through natural spawning. The most suitable species for the numerous high, cold lakes is an important problem which received much attention.

A party of three biologists began survey work in Glacier Park June 5 and continued in the field until September 13. The United States Fisheries station at Glacier Park was made the base of operations. Thirty-two streams, 35 lakes and their principal tributaries, constituting about one third of the accessible waters of the park, were examined during this period. Few of these waters can be reached by road so that much of the work had to be accomplished using pack and saddle horses. All equipment was selected with this in view and proved to be very satisfactory.

The National Park Service, represented by Supt. E. T. Scoyen and his assistants, aided the work materially by supplying information and by loaning equipment.

The facts available from the study were used in assigning fish for the waters of the park this season. Although limited time and lack of equipment prevented the analysis of samples and all data in the field, it was found possible to offer some definite suggestions for planting in 1932.

In the study of streams information concerning the following was collected: Average width and depth, volume, velocity, gradient, color and turbidity, fluctuation in level, temperature, bottom composition, condition of pools, location and height of barriers to fish movement, character of watershed, presence of springs, character of tributary streams, hydrogen-ion concentration, alkalinity, type and abundance of aquatic vegetation, relative abundance of primary fish foods, relative abundance and size of game and forage fish, conditions for natural spawning and evidence of its success, presence of fish enemies and parasites and the quality and intensity of the fishing.

Survey of lakes included observation and record of the following: Altitude, approximate area, length of shore line, character of watershed, fluctuation in water level, type of shore and bottom, location

and extent of shoal areas, sufficient soundings to indicate the type, inlet and outlet streams, color and transparency, temperature at the surface and at intervals to the bottom, hydrogen-ion concentration, quantity of oxygen and carbon dioxide, alkalinity as indicated by carbonates and bicarbonates, type and abundance of vegetation, relative abundance of fish food, relative abundance and size of game and forage fish, presence of spawning grounds and evidence of natural reproduction and, finally, the quality and intensity of the fishing.

In addition to this routine examination employed in single studies of lakes and streams, seasonal studies were made at monthly intervals on five typical lakes east of the Continental Divide. At selected stations on these lakes the following data were secured: Transparency, temperature at regular intervals from surface to bottom, chemical analyses, vertical plankton hauls, samples of the bottom fauna and of the fish for food and growth studies. The level and temperature of several principal streams were also recorded throughout the season.

Collections of aquatic plants and principal fish foods were secured from all waters studied and whenever possible fish were collected for the purpose of food and growth determination. Certain waters offering special problems were studied more in detail with the object of determining the reason for marked success or failure in planting. The results of natural spawning were deemed a problem of first importance and every effort was made to secure as much information as possible on this subject.

At the close of field work operations were transferred to the Bureau's laboratories at the University of Utah in Salt Lake City, where a study of the data collected is in progress. The results of this survey will appear in a publication by the Bureau when funds for this purpose are available.

Wasatch National Forest investigation.—Owing to lack of funds further limnological studies in the Wasatch National Forest, Utah, could not be pursued. The data collected here during the seasons of 1930 and 1931 have been studied, and a stocking plan inaugurated for the principal waters of this forest. This plan was followed insofar as cooperation of the Bureau, the United States Forest Service, and the Utah Fish and Game Department could be effected. Although results of this plan will not be apparent for several years, one outstanding success of the survey's recommendations should be mentioned. One of the principal, heavily fished lakes of the Wasatch was found to be overstocked with poor-conditioned fish at the time of the survey. It was recommended that no more trout be planted here until August 1932, when a limited number of legal fish should be released to replace those removed earlier in the season. This plan was followed and resulted in a marked improvement in the condition of the trout and good fishing prevailed throughout the summer. It is believed that this result indicates the success which can be attained by properly balancing stocking against carrying capacity.

OTHER LIMNOLOGICAL STUDIES

Spring Creek investigation.—At the request of the Weber County Sportsmen's Association, an examination of Spring Creek, Utah, was made to determine if food had recovered sufficiently to warrant

stocking this year. Pollution from a pea vinery in 1930 had killed many trout in a section of the stream.

A study of the food organisms was made above and below the point of pollution. It was found that conditions were approximately the same in both sections of the stream except that may fly and stone fly nymphs averaged much smaller in size in the lower section. Large shrimp were common in both parts of the stream. From these observations it was decided that recovery was practically complete and that stocking with a limited number of trout might be safely resumed.

Georgetown Lake.—At the request of the Montana Fish and Game Commission, a brief investigation was made concerning the mortality suffered by adult cutthroat trout and grayling in Georgetown Lake. The seriousness of the annual loss in fish at this important spawn-collecting station may be judged from estimates which run from 2,500 to 15,000 adult trout and grayling. The cause of this mortality, which has steadily increased during the last three years, has been attributed to a number of conditions which have been eliminated with no resulting improvement.

Other duties prevented more than a preliminary investigation at Georgetown Lake. Macroscopic examination of freshly dead specimens were made. Approximately half of the trout appeared normal except that the peritoneum was blotched and speckled with bloody areas. Presence of food in the stomach and considerable fat on the viscera indicated sudden death. The remaining trout and all grayling examined exhibited reddened areas or vertical red scratches just behind the pectoral fin and in some cases posterior to the dorsal or near the vent which permeated the tissues to a considerable depth. Sex determination indicated that the loss at this time appeared to be almost wholly confined to the females.

The presence of bacterial infection probably aggravated by crowding and high water temperatures was suggested. A thorough study throughout the following season was recommended.

Payette Lake.—At the request of the Idaho Fish and Game Department, a brief limnological study was made of Payette Lake during October to determine the best planting policy for these waters. Consistent stocking with good sized fingerling trout during past years had not shown the anticipated improvement in fishing.

The usual procedure for study was followed which indicated that Payette Lake is deficient in food production presumably due to limited shoal areas, scarcity of aquatic vegetation, unproductive bottom, and lime deficiency. It was recommended that recently enacted measures protecting the spawning grounds of the principal fishes (redfish, redside cutthroat, and whitefish) be continued and that the redfish and cutthroat be encouraged by artificial propagation. The proposed introduction of bass and mackinaw was condemned in view of the food scarcity and danger to the valuable native fishes.

MUSSEL INVESTIGATIONS AND POLLUTION STUDIES IN INTERIOR WATERS

The various activities carried forward by the staff headquartered at the University of Missouri, under the direction of Dr. M. M. Ellis, have been grouped under two headings, namely, pollution and mussel propagation studies, largely as a matter of mechanical convenience.

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In actual work the two sets of operations have been intimately associated, each serving to further the interest of the other, so that the distinction is less real than the headings would indicate.

POLLUTION STUDIES IN THE MISSISSIPPI

In cooperation with the Corps of Engineers, United States War Department, the studies of the Mississippi River and its tributaries with particular reference with fisheries problems as influenced by both pollution and navigation have been continued during 1932. Three portions of the Mississippi River were given particular attention.

A survey of the Hastings Pool, that portion of the Mississippi River impounded by the Hastings Dam and lying roughly between Hastings and Minneapolis, Minn., was made with special attention to the effects of the polluted waters held in this pool, on the lateral and connecting sloughs and lakes. Detailed plankton and chemical studies were made and a condensed report on this investigation is now in the hands of the War Department and United States district attorney for the Minneapolis district. These data will also be included in the forthcoming report on the Mississippi River.

Using the Engineer boat yards at Keokuk, Iowa, as headquarters, observations on Lake Keokuk were continued at various times through the spring, fall, and winter of 1932 in addition to the intensive studies of this lake during the months of May, June, and July. The effects of pollution, silt, and sudden changes in water level incident to the run-off from storms, on water conditions, fish food, and the bottom fauna were the major contacts. From these studies together with those of the two previous summers a very complete picture of the chemical, physical, and biological conditions now obtaining in this artifical river lake is now available not only for the Mississsippi problems but as a standard for the evaluation of fisheries conditions in other such river lakes. The action of silt on the basic fish food, plankton, has been given special consideration throughout these studies and correlations with the chemical and physical changes in the water have been made. These findings as part of the Mississippi River report are now being put in final form and soon will be available for publication.

The United States Fisheries laboratory, quarterboat *No. 348*, and appended boats, after serving as a base of operations for the studies at Lake Keokuk were moved down river to Grafton, Ill., early in August, and a survey of the Mississippi River between Grafton, Ill., and Hannibal, Mo., was completed. This portion of the river had been given little attention in the previous pollution work carried forward by the unit. The Grafton-Hannibal survey occupied some 5 weeks during August and the first of September.

Summarizing all of the Mississippi River studies which are being united into a report covering the Mississippi River from Minneapolis to Cairo, the Ohio from Cairo to Evansville, Ind., and the Tennessee from Paducah, Ky., to the Hiwassee River above Chattanooga, the enormous damage to fisheries and fishery industries by uncontrolled erosion is outstanding. Operating with the silt are municipal sewage and industrial wastes both greatly increasing the pollution hazards. Data obtained throughout this survey show that the uncontrolled introduction of silt into these streams has tremendously increased the

areas disturbed by the major pollution centers such as the Minneapolis-St. Paul, Davenport-Rock Island, and St. Louis districts, since such silt makes it impossible for the streams to rid themselves of the huge volumes of various organic wastes which are now being poured into these waters. Since the actual volume of municipal wastes has increased so enormously during the past few years, and as it is now coupled with silt the general pollution problem has become so serious in the Mississippi River and tributary streams that the aquatic life has been practically reduced to those few undesirable forms capable of surviving in highly polluted water in large stretches of these streams and the combined pollution is spreading with amazing rapidity.

MINE POLLUTION IN COEUR D'ALENE DISTRICT IN IDAHO

In cooperation with the Coeur d'Alene River and Lake Commission appointed by the State of Idaho to investigate mine pollution conditions in the Coeur d'Alene district, Dr. Ellis and party conducted a field survey in this district during the month of July. Various samples of material were forwarded to the Columbia laboratory where detailed physiological and biochemical studies were made. A report on these investigations has been sent to the State of Idaho, and the findings may be summarized briefly as follows:

1. The mine wastes collectively have killed out practically all forms of aquatic life for 50 miles in the Coeur d'Alene River.
2. The destructive action of these mine wastes is due to the enormous bulk of finely powdered rock which has literally smothered every living thing on the stream bed, and to the production of toxic substances (chiefly lead and zinc compounds) from the mine wastes which are deposited during high water on the flats along the stream and from which toxic products reenter the stream following high water or rain.
3. The pollution has extended well across Coeur d'Alene Lake out through Spokane River and into the State of Washington, but has not yet become critical beyond Coeur d'Alene Lake.
4. The polluted waters of Coeur d'Alene River were found to be highly toxic to both native fish and various plankton organisms.
5. The experimental work with the various mine wastes and chemicals used in the mining processes demonstrated the toxicity of several of these substances to aquatic life, fish developing typical lead-poisoning symptoms when exposed to combinations of these mine wastes.
6. Studies made in Canada at similar mines and mills operating under similar conditions show that these polluting materials can be handled by the mines and the stream pollution eliminated, as a method of disposal of mine wastes has already been worked out and is now in satisfactory operation in Canada.

LABORATORY STUDIES OF POLLUTION

In connection with all of the above investigations over 5,000 samples of water carrying erosion silt have been studied during the past year. These samples were collected from important stations in various parts of the Mississippi Valley, and in Idaho, Texas, Washington, and British Columbia. As a result of these studies the action of silt on the chemical composition of river waters, the effect of

silt in screening and sorting light in river and lake waters, and the changes in water temperature, dissolved gases, and other chemical reactions of the river waters as a result of presence of suspended silt have been determined. A report on the technical aspects of this problem and application of these technical facts to the economic fisheries problems produced by silt is now in preparation.

In the course of the pollution studies methods for use of the plankton animals as "index" or "test" animals in pollution studies have been worked out. Both because of their economic importance as one of the basic links in the food chain of most aquatic animals and because of their physiological reactions, plankton have been found to be very suitable for pollution tests. A discussion and description of these methods is to appear shortly in a technical journal.

In connection with both the Idaho pollution studies and the general survey of the Mississippi River and its tributaries, large series of experiments dealing with the effect of lead, zinc, ammonia, sulphur, and various specific substances present in particular types of industrial wastes have been made on fishes, fresh-water mussels, plankton, and other aquatic animals. These tests have provided basic information for the evaluation of pollution findings not only in the specific cases involved but for future investigations.

MUSSEL PROPAGATION

During the year 1932 a large-scale experiment carrying with it various appended studies on the growth, survival, feeding, and general health of fresh-water mussels, both juvenile and adult, in confined areas where the particular environment can be specifically controlled, was begun at the Fort Worth station of the United States Bureau of Fisheries. Raceways having various types of bottoms over which water of different depths is maintained have been planted with young and adult mussels of various species. Not only have the economic species of Texas been planted in these raceways, but shipments of important species from Indiana, Iowa, Arkansas, Illinois, and Missouri have also been made to Fort Worth.

The particular objective is the determination of the maximum number of fresh-water mussels which may be raised successfully in a given area by artificial propagation, artificial planting, and from selected brood stock. By means of special apparatus continuous series of observations on water conditions, food requirements, growth, and activities of these mussels are being obtained daily by an investigator detailed to this laboratory. Since each mussel is marked, the relative death rate of the various species and state of health and growth of each individual are being checked from week to week. At intervals the raceways are emptied of water and the mussel population inspected directly.

As this experiment must be continued over a period of 2 to 3 years before final results can be stated only an advance report can be given at the present time. Gratifying results, however, have been obtained in the growth, crowding, and feeding tests, and these findings at present seem to indicate that a very large number of mussels may be successfully crowded into a small space if proper water and food conditions are maintained. At present over 6,000 adult mussels are under observation in these raceways as well as various plantings of young.

In connection with the Fort Worth propagation experiment, feeding and food requirement experiments are being carried on continuously in the Columbia (Mo.) laboratories. One set of experiments recently completed has shown that fresh-water mussels can live for a period of 18 months or longer without food, but that during starvation periods serious changes in shell and soft parts take place. Through the studies of the utilization of various food constituents by the mussels, data have already been collected showing that the mussels may be fed various inexpensive foods successfully and their health and activity greatly improved. At present a series of tests are going forward dealing with the requirements for shell production, and it has been found that a certain diet greatly increases the growth of shell and the deposit of lime in the shell. These experiments have, of course, immediate practical value in accounting for differences in shell quality in different streams and are to be applied this spring to the feeding of mussels in captivity in the Fort Worth raceways.

In connection with the artificial propagation work, the factors regulating the spawning and production of glochidia in the gravid female are in progress. One of the difficulties in handling gravid mussels of certain species is a tendency to abort the unripe glochidia. Factors surrounding these complexes are now under investigation.

Mussels population and growth studies in various of the major shell-producing tributaries of the Mississippi have been completed during the current year and the data are being tabulated and plotted as rapidly as possible. Over 12,000 shells have been examined; and the relation between chemical composition of the water pollution and erosion silt have been correlated with the population, growth, and pollution studies. From these studies it is now well established that, with the exception of the paper shells and certain other undesirable species of mussels, the great majority of our fresh-water mussels are not maintaining a replacement population; that is, the various commercial species of mussels are falling behind in annual replacement even in the undisturbed and closed streams as a result of the increasing pollution and erosion hazards. In the main, there has been little successful replacement of fresh-water mussels in the Mississippi Valley, except in a few restricted local areas, since production of the year class of 1925.

In connection with all of the mussel studies various observations on the life history, biology, and ecology of various mussel species have been made. One in particular may be mentioned, namely, the very curious spawning of the Arkansas fan shell *Cyprogena alberti* (Conrad) which has been worked out in the laboratory for the first time.

INDEPENDENT ACTIVITIES OF FISHERY BIOLOGICAL LABORATORIES

WOODS HOLE, MASS.

The biological station at Woods Hole continued to serve the needs of Bureau investigators during the spring and summer of 1932, though lack of funds prevented the furnishing of facilities to guest investigators as had been, up to this time, the long-established policy of the bureau.

Among the activities at the laboratory were: Studies on the physiology of the oyster and control of starfish by Dr. P. S. Galtsoff and

assistants; investigation of survival of mackerel larvae on the offshore spawning grounds by O. E. Sette, with the *Albatross II* basing at the station; study of the physiology of year-mark formation on fish scales by R. A. Nesbit; experimental rearing of fish larvae by Louella E. Cable; study of the effects of temperature on the incubation of mackerel eggs by Leonard G. Worley; and study of the abundance and growth of young scup, sea bass, and squeteague in the Woods Hole region by Prof. A. E. Parr of the Bingham Oceanographic Foundation. The new station tender, *Phalarope II*, proved admirably fitted to the young-fish trawling and other services at the station.

BEAUFORT, N.C.

Research.—Operation of the Beaufort laboratory was continued throughout the year under the direction of Dr. H. F. Prytherch and furnished facilities for the study of fishery problems of the South Atlantic region. The chief investigations conducted here at present by the Bureau's staff, as reported elsewhere, deal with the application of science to oyster farming in southern waters, the development of new methods of opening oysters, the reproduction and distribution of shrimp, and the propagation of the diamondback terrapin. Laboratory facilities for marine research have been furnished to 16 independent research workers from other institutions who have engaged in the following studies: Dr. H. V. Wilson, University of North Carolina, development of sponges; Dr. Ezda Deviney, Florida State College for Women, regeneration in Ascidians; Dr. O. W. Hyman, University of Tennessee, larval development of the stone crab; Dr. Elinor H. Behre, Louisiana State University, effect of environmental changes on chromatophores of some invertebrates; Dr. W. C. George, University of North Carolina, chordate blood; J. Paul Reynolds, Johns Hopkins University, marine fauna; Mabel L. Bacon, University of North Carolina, air bladder and ear of certain fishes; Dr. Hoyt S. Hopkins, New York University, growth rate, distribution of catalase in bivalve mollusks; Dr. Irving E. Gray, Duke University, swim bladder of fishes; Henry Vander Schalie, University of Michigan, faunal relations of Naiades to brackish water; Dr. Bert Cunningham, Duke University, embryonic development of terrapin; Dr. Leon C. Chesley, Duke University, digestion in marine fishes; Joseph M. Odiorne, Harvard University, color changes in Fundulus; F. R. Brown, University of North Carolina, distribution of echinoderms; Dr. Everett I. Evans, United States Department of Agriculture, physiology of sex in mammals; J. P. Givler, North Carolina College for Women, embryology of the alligator.

The facilities of the station were also utilized by the United States Chemical Warfare Service for tests of wood preservatives and by the Bureau's Division of Fishery Industries for experiments with treated rope under various tidal conditions. Cooperative tests were made with the Woolsey Paint Co. in respect to antifouling and protective value of copper paints and with the Colvulc Rubber Co. for similar experiments with rubber paint products.

Terrapin culture.—A new record in the propagation of the diamondback terrapin was established in the rearing of the 1931–32 brood which exceeded by over 95 percent the number grown and distributed by this station during previous years. During the period from May 7

to 25, 1932, a total of 11,086 young of the diamondback terrapin were distributed in the waters of North Carolina by the Bureau in cooperation with the State Department of Conservation and Development.

In recent years the propagation of the terrapin has met with increasing success so that it has been possible to release consequential numbers of young each spring. The output of the Beaufort station hatchery since 1928 has been as follows: 1928, 5,388; 1929, 5,855; 1930, 5,778; 1931, 5,500; and 1932, 11,086. Previous to liberation the shell of the terrapin is marked or punctured in order that those released by the hatchery may be identified later in the commercial catches. Many of those distributed previously have been caught by fishermen in this region which indicates that such propagation operations are effective in increasing the supply of these animals.

The destruction of young by certain diseases, particularly that known as "sore tail", has been reduced to a large extent by chemical treatment. By regularly sterilizing the rearing troughs with strong salt brine and using therein small pieces of metallic copper the mortality of young has been limited to less than 9 percent of the total brood for 1931–32. The propagation of this species will be conducted in the future by the Division of Fish Culture, and more extensive distribution of the young terrapin will be made throughout the South Atlantic region.

APPROPRIATIONS

During the fiscal year ending June 30, 1932, $322,500 was provided for the scientific work of the Division. For the remaining half of the year appropriations available for the fiscal year 1933 totaling approximately $222,000 were available. These figures represent the combined appropriations from various accounts, except funds spent for vessel operations in connection with scientific work, which totaled $14,000 additional. This represents a reduction of 31 percent over the previous year in the funds appropriated for inquiry and has necessitated in addition to the curtailment of all activities and abandonment of some, the serious reduction of fishery investigations in the North Atlantic offshore area by the decommissioning of the Fisheries research steamer *Albatross II*. Thus, the Bureau is left with no means whatever of conducting certain types of investigations on the fishing grounds where the most important marine fisheries of the United States are prosecuted.

The funds were allotted in the various sections of the country as follows: For fishery investigations in the North and Middle Atlantic area, 21 percent; for the South Atlantic and Gulf area, 16 percent; for the Great Lakes, 9 percent; for the Pacific coast and Alaska, 21 percent; for the Mississippi and Gulf drainage, exclusive of game fish propagation studies, 6 percent; for studies on the conservation of fish by means of screens and ladders, 3 percent; unallocated as to geographic districts, funds for the investigation of cultivation of oysters and shellfish amounted to 4 percent, and for studies in the interest of fish culture and stocking of game fishes, 17 percent.

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FISHERY INDUSTRIES OF THE UNITED STATES, 1932[1]

By R. H. Fiedler

Chief, Division of Fishery Industries

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FOREWORD

This report constitutes a summary of the activities of the Division of Fishery Industries as well as an annual review on fishery statistics of the United States. As its name indicates, this Division of the Bureau is concerned with the activities and welfare of the fishery industries, including the commercial fisheries, the trade in fishery products, and the fish canning and preserving industries. Its functions include the collection and publication of fishery statistics, the conducting of market surveys, the prosecution of research designed

[1] Appendix III to the Report of the U.S. Commissioner of Fisheries, 1933. Approved for publication May 8, 1933.

to solve the technical problems of the industry, and the dissemination of authoritative and practical information to the fishery industries and the public. Results of technological investigations and marketing studies are published in separate documents as each project is completed. The information obtained from statistical surveys is published in part 2 of this report, which includes detailed statistical information for the year 1931 that has become available since the issuance of the previous report,[2] together with such summarized statements and interpretations of the statistics as are deemed significant and useful. In the preparation of this report, members of the Division's staff have taken part and their assistance is appreciatively acknowledged.

Part 1. OPERATIONS OF THE DIVISION

COLLECTION OF STATISTICS

The statistical work of the Division in 1932, as in former years, included the collection and dissemination of statistics on the catch of fishery products and the gear employed in making the catch and statistics of related fishery industries. In the former group are statistics that are intended for the use of the fishery biologist upon which to base conservation measures. They are also valuable for economic purposes. This is especially true of statistics of the landings of fish at principal fishing ports, which are published monthly. In the second group are statistics that are of use mainly for economic or trade purposes. These include statistics of the manufactured fishery products and byproducts of the United States, cold-storage holdings of fish and amounts of fish frozen in the United States, marine-animal oil production, and similar statistics.

Continuing with the plan of making annual general statistical surveys of the fisheries of various geographical sections, the Division in 1932 under the direction of F. F. Johnson canvassed the fisheries prosecuted in our entire coastal, lake, and Mississippi River sections, obtaining catch figures for 1931. Continuous annual catch figures are now available for the Great Lakes from 1913, Pacific Coast States from 1922, South Atlantic and Gulf States from 1927, New England States from 1928, and the Middle Atlantic and Chesapeake Bay States from 1929. The survey made of the fisheries of the Mississippi River and tributaries for 1931 was the first complete canvass made since 1922.

In addition to the general catch statistics, the collection and (or) publication of statistics on special subjects for the year 1932, was continued during the year, as follows: The landings of fish by American fishing vessels at the ports of Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash. (published monthly); landings of halibut at North Pacific coast ports (published monthly); catch of mackerel in the North Atlantic fishery; cold-storage holdings of frozen and cured fish and amount of fish frozen, which are furnished by the Bureau of Agricultural Economics (published monthly); production, consumption, and holdings of marine-animal oils of the United States and Alaska (published quarterly by the Bureau of the Census); production of manufactured fishery products and byproducts of the United States and Alaska during 1932; the catch of

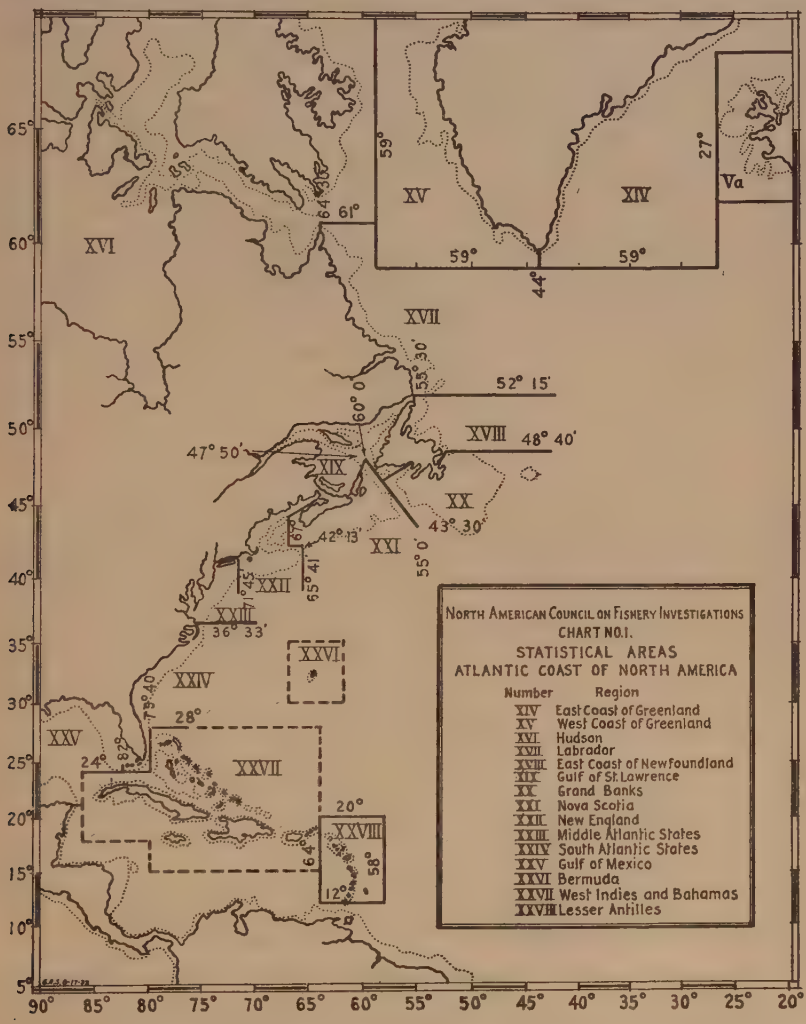
[2] Fishery Industries of the United States, 1931. By R. H. Fiedler, Appendix II to the Report of the U.S. Commissioner of Fisheries for 1932, pp. 97–440.

shad in the Potomac and Hudson Rivers, and the catch of alewives in the Potomac River during 1932; transactions on the sponge exchange at Tarpon Springs, Fla., during 1932; volume of fishery products handled at the municipal fish wharf and market, Washington, D.C., during 1932, and the volume of United States imports and exports of fishery products during 1932, furnished by the Bureau of Foreign and Domestic Commerce.

In the above surveys the division continued to receive cooperation from many of the State fishery agencies, which aided materially in the work.

STATISTICAL AREAS

At the nineteenth meeting held at Washington, D.C., on October 20 and 21, 1932, of the North American Council on Fishery Investiga-



tions, consisting of representatives from Canada, Newfoundland, France, and the United States, there were adopted uniform statistical

areas to facilitate the clear presentation of statistics of the western Atlantic and Gulf fisheries. These areas, which are shown together with their designating numbers in the accompanying chart, are indicated in the various sections of this report.

TECHNOLOGICAL INVESTIGATIONS

Never before in the history of the fishery industry of this country has there been greater need for economy in production methods and for the fullest utilization of valuable products from the material at hand. Under present conditions of depressed business, losses or leakages in factory operation, which in more prosperous times seemed relatively unimportant, now represent very frequently the margin between profit and loss. For this reason there is greater need for the application of the best technological and engineering knowledge available to problems of manufacture, preservation, and marketing of marine products. This is essential to make the most of the raw material available, to eliminate waste, and to bring factory operation to the highest point of efficiency. With this objective in mind, the technological research of the Division has followed the general lines of studies of methods of manufacture, preservation, storage, and marketing of both the primary products of the fisheries for food and the by-products for animal nutrition; biochemical tests to determine the food value of marine products; the development of fishing gear; and experiments in developing chemical treatments for fishing nets to lengthen their usefulness. This has involved the application of the sciences of chemistry, engineering, bacteriology, and general technology to the solution of these problems. The discussion in the following pages is a summary of the accomplishments along these lines which have been made during the past year.

RESEARCH ASSOCIATE

In the above lines of technological research the Bureau has attacked those fundamental problems which promise to be of greatest value to the largest number and which are possible with the funds and personnel available for the purpose. For this reason the Division has not been able to study special problems affecting certain products, processes, or methods. In order to serve the industry in this connection, the Bureau by congressional authorization has provided research associate facilities whereby firms or groups having special technological problems to solve will furnish the investigator and pay his salary and expenses. The investigation is carried out in cooperation with the Bureau's staff in its laboratories and under its control. Thus the industry can be provided with laboratory, consultation, and library facilities which in many instances it is unable to obtain elsewhere.

During the past year a manufacturer of marine products took advantage of these facilities and placed a chemist in the Division's laboratory to make a study of the nutritive value of kelp meal.

LABORATORIES

During the past year the Division carried on its technological research work under the direction of John Ruel Manning at laboratories in

Washington, D.C., and Gloucester, Mass., and has provided equipment for a laboratory in the Bureau's new building in Seattle, Wash. In addition, work was conducted in other laboratories as conditions warranted. For instance, certain cooperative biochemical studies were conducted at the laboratories of the South Carolina Food Research Commission, Charleston, S.C.; the experimental farm of the Department of Agriculture, Beltsville, Md.; the Ohio Agricultural Experiment Station, Wooster, Ohio; the New York State College of Agriculture, Cornell, Ithaca, N.Y.; and the North Carolina State College of Agriculture, Raleigh, N.C.

NUTRITIVE VALUE OF MARINE PRODUCTS

SALMON-LIVER OIL

With the introduction of halibut-liver oil, which is very potent in vitamin A, the Bureau received numerous requests for some other source of oil which would compare in vitamin A potency with halibut-liver oil. From the results obtained in the study of salmon oil, it appeared that the oil from salmon livers might offer such a source, especially since salmon livers can be obtained in large amounts. For this reason arrangements were made to obtain samples of material from the five species of salmon.

The samples were prepared in the same manner as those used in the salmon-oil investigation reported previously. Fresh raw material was placed in cans, evacuated, sealed, and processed for 1 hour at 228° F. These samples were prepared at Seattle, Wash., and other Pacific coast points by Norman D. Jarvis, one of the Division's technologists. The cans were shipped to the laboratory in Washington, D.C., where the oil was rendered and the chemical and physical properties and the vitamin content of the oils are being determined. Dr. Chester D. Tolle and Charles F. Lee, two members of the Division's technological staff, are carrying out this investigation.

The results so far obtained show that the salmon-liver oils are from 10 to 12 times as potent in vitamin A as the salmon oils previously tested. However, since under present conditions it requires solvent extraction to obtain oil from salmon livers, and since added expense would be necessary in recovering the livers from the cannery trimmings, careful consideration should be given to these factors in any commercial undertaking.

ANTIANEMIC PROPERTIES OF OYSTERS

Through the cooperative arrangement with the South Carolina Food Research Commission, Charleston, S.C., E. Jack Coulson, of the technological staff, has continued the investigation dealing with the antianemic properties of oysters. A second series of samples taken from the same oyster beds as the first, but at a different season, was collected and analyzed for iron, copper, and manganese content.

These samples showed the same relative tendency toward grouping by locality as did the first series, namely: (1) North Atlantic, with high copper, low iron, and low manganese; (2) South Atlantic, with

high iron, low copper, and low manganese; and (3) Gulf, with high iron, low copper, and high manganese. These oysters from different localities were fed to anemic animals and all induced regeneration of hemoglobin, thus giving further evidence of the importance of oysters as a source of iron in addition to their other food factors.

KELP MEAL EXPERIMENTS

Cooperative work with a producer of kelp meal was continued by Dr. H. P. Morris, research associate of our technological staff, in the Washington laboratory to determine the nutritive value of kelp meal. The work completed with laboratory animals to which diets composed of plant substances, with and without the addition of kelp meal were fed, indicates that kelp meal has a beneficial effect on growth. With some diets the addition of kelp meal definitely stimulated appetite. However, with the diet in which linseed oil meal supplied the protein this was not the case. The greater growth of the rats in this experiment can probably be ascribed to the mineral content of the kelp meal. The increased growth was not due to sodium or potassium chloride, as the control diets were corrected for these salts.

At the conclusion of the experiments with laboratory animals arrangements were made with the Poultry Office, Bureau of Animal Industry, United States Department of Agriculture, for a cooperative study to determine the value of kelp meal when fed to poultry. However, due to the withdrawal of financial support by the kelp-meal producer, this work was discontinued December 31, 1932, before enough data had been accumulated to draw definite conclusions.

PRESERVATION OF FISHERY PRODUCTS FOR FOOD

IMPROVED METHODS FOR HANDLING FRESH AND FROZEN FISH

Studies dealing with the relative freshness of fish were continued during the year at the Gloucester technological laboratory under the direction of James M. Lemon with the assistance of Maurice E. Stansby. Several methods for packing fresh fish were studied and the rate of spoilage under each was determined. It is expected that final results of this research will indicate methods for packing which are the least injurious to fish and which will yield the highest grade of product.

Efforts also were made to determine the temperature at which frozen fish suffer the least deterioration during storage. It is known that certain of the enzymes found in the flesh of fish continue to function even at low temperatures. The study of this problem deals with these changes, and efforts are being made to effect a method which will retard this enzymic action.

The technique of freezing and storing several varieties of shellfish is being given consideration for the reason that more efficient methods for this would be of great aid to the oyster, crab, and shrimp industries. Thus far very little is known of the effects of freezing and long storage upon these products. These studies are aimed to determine the proper temperature for freezing, the most efficient temperature for storage, the effect of defrosting and refreezing, and the rate of spoilage after defrosting.

IMPROVED METHODS FOR SMOKING FISH

The control of temperature, humidity, and smoke in smoking fish has been applied to the preparation of finnan haddie on a semicommercial scale. It has been found possible to reduce the loss of moisture to a considerable extent by employing a comparatively low temperature and a relatively high humidity in the smokehouse. At a temperature of 100° F. and a relative humidity of approximately 60 percent, it has been shown that finnan haddie can be produced containing an average of 72 percent moisture. This moisture content is 5 to 10 percent higher than the average commercial product, and means considerable saving to the smoking firm in that it reduces their losses.

BACTERIOLOGICAL STUDIES

During the past year Francis P. Griffiths, bacteriologist of the Division, continued studies at the Gloucester laboratory of the relation of bacteria to the preservation of fish. As a result of his studies it has been found that formaldehyde contained in the smoke has but very slight preservative effect upon light smoked finnan haddie for the reason that the concentration is so low. While brining the fish before smoking adds to the flavor, it has been found that its preservative effect also is practically negligible. This may actually become a source of infection, depending upon the type of salt employed in the preparation of the brine.

The effect of the rate of freezing and temperature of storage upon the survival and growth of bacteria usually found on haddock fillets has been investigated by Mr. Griffiths, and work is being extended to include several pathogenic bacteria in the tests. In conjunction with the research cited previously dealing with the relative freshness of fish, Mr. Griffiths also made numerous tests to correlate a chemical test for freshness with the bacterial count of the fish flesh with very encouraging results.

PRESERVATION OF FISHERY BYPRODUCTS

During the past year the research in connection with the preservation of fishery byproducts carried on at the Gloucester technological laboratory has been a continuation of the projects outlined in the report of the Division for 1931. This was carried on by Roger W. Harrison, with the assistance of Andrew W. Anderson and S. R. Pottinger.

IMPROVED METHODS FOR MANUFACTURING FISH MEAL FROM NONOILY FISH WASTE

The utilization of waste from the preparation of packaged fishery products, especially ground fish, has an important bearing upon both the fishing and agricultural industries, for the conversion of this waste into a useful product such as fish meal brings added revenue to the fishing industry and brings to agriculture one of the most highly nutritive protein concentrates obtainable. As a service to these industries, it is pertinent that the fundamental factors of manufacture as related to the preservation of nutritional value be fully understood and, further, it is also of primary importance to obtain information as to the most economical means of obtaining this end. The studies, therefore, have been carried on with these aims in mind.

Test materials were prepared under carefully controlled conditions in a manner so that each factor of manufacture could be measured. The test materials were then submitted to the Ohio Agricultural Experiment Station and Cornell University Agricultural Experiment Station, where tests for general nutritive value, digestibility, and vitamin G potency were made. Portions of the same samples were tested chemically in the Gloucester laboratory for the possible destruction of several essential amino acids which are present in fish protein in limiting amounts. Further, exhaustive engineering studies were carried on to determine the economies of various methods of manufacture. At the present writing the various studies are practically completed, but final conclusions can not be drawn until all phases can be considered collectively. Preliminary data indicate that digestibility, vitamin value, and general nutritive value are affected by drying time, temperature of drying, and method of applying heat, while the essential amino acid, cystine, is affected more by temperature.

DEVELOPMENT OF FISH FLOUR

Much of the material now converted into fish meal is suitable for human consumption. This material consists essentially of the backbones, with adhering flesh, which is accumulated in the preparation of fish fillets. In view of recent studies in nutrition, showing the importance of minerals in the human diet, this material should form the basis of a valuable food product. Further, there is a need for dessicated foods, for special feeding purposes, which could replace the amount of raw foods used, providing the dried product retained essentially the vital factors of the fresh product. Evidence being obtained from the studies on fish-meal manufacture indicate the conditions prevailing in what is known as spray of flash drying should yield a product approaching the properties desired for the uses stated above. Studies to date have been concerned with methods of reducing fish waste to a consistency which will permit atomization and the development of a suitable apparatus to cause atomization.

HADDOCK-LIVER OIL

Fishing companies operating trawlers, catching largely haddock, have been concerned with a problem which indicated possible difficulty in the marketing of oil for therapeutic use prepared from the livers of the catch. This was due to the fact that the iodine number of haddock-liver oil might be sufficiently high to bring a quantity of oil, running largely haddock, above the maximum iodine number limit of 180 prescribed by the United States Pharmacopoeia. During the past year oils prepared from haddock livers obtained from numerous fishing grounds, at varying intervals, have been tested for their physical and chemical constants. In only one of the 30 to 40 samples tested did the iodine number of the crude oil exceed the maximum limit of 180. However, considering the increase of iodine number caused by the removal of the more saturated glycerides during cold pressing, a larger number exceeding the upper United States Pharmacopoeia limit would have been recorded had facilities been available for satisfactory cold pressing small samples of oil. The significance of this is somewhat confused by the relatively low vitamin values

shown by the haddock-liver oils when tested both biologically and colorimetrically.

Tests with the colorimetric method of determining vitamin A, when compared to biological results on the same oils indicate that this rapid method offers a valuable aid to liver oil manufacturers for keeping a rough control on the vitamin A value of the various lots of oil prepared.

NET PRESERVATION

The testing of preservatives for heavy nets was continued during 1932 by W. T. Conn, technologist of the Division, to twines used in lake and river waters in addition to those used in salt and brackish waters. From tests extending over a period of three years a principle of preservation has been established which has proved efficacious for this type of net even when subjected to exposure in water for long periods. In its simplified form this principle consists of giving the twine a series of treatments which in some way apparently effect a chemical change in its composition and then giving it a cover treatment. The first series of treatments consists of degumming or cleansing the twine from natural resins and from oil added to it in the mill, then a chemical treatment which subjects the degummed twine to a toxic dyeing, followed by a fixing treatment and then thorough washing in clean water. For the final, or cover, treatment, the twine is coated with tar. In this connection no tar has been found which is superior to the specification tar previously recommended by this Bureau, although a high acid tar has been found beneficial.

Twines prepared as above have shown great resistance to depreciation in every locality where exposures were made during the past 3 years.

Research on net preservation also has shown that mercury, in organic combination, mixed with the tar is highly efficacious in killing marine weeds as well as acting as a preservative agent.

The beneficial use of antioxidants in connection with preservatives for twine has been confirmed. A very powerful antioxidant has been found which when mixed in very small proportions in tar acts as a preservative for both the tar and the twine.

It is apparent that the preservation of most seines and light nets is dependent upon proper cleansing and storage. In line with this, the Bureau has advocated the washing of gill nets with lime water. Where this recommendation was followed in 1932 it was observed that the life of the nets was trebled, especially when they were washed immediately after the fish were removed. Further study of the drying and storage of fishing nets in the shade has confirmed previous recommendations for this practice.

In cooperation with the Bureau of Construction and Repair, Navy Department, an extensive investigation of the preservation of manila rope has been carried on through the year and will extend into 1933. As a result of this work it is expected that formulae will be developed for the preservation of ropes under all conditions.

In the course of this investigation principles of preservation have been developed that may be of considerable value when applied to other textile material such as sails, awnings, thread, etc.

MEASUREMENT OF MESH SIZE OF FISHING NETS

For many years there has been a controversy over the proper method for determining the mesh size of nets fished in the Great Lakes region. This has led to confusion among fishermen, State authorities, and net manufacturers. At the request of law-enforcement authorities in this region the Bureau of Fisheries and the Bureau of Standards cooperated in an extensive laboratory and field investigation of this problem in an effort to correct this condition. As a result of this work a principle for determining legal mesh measurements by a spring steel gage was developed and has been generally accepted by the State authorities.

RED SNAPPER FISHERY AND INDUSTRY

During the past year a study was made by Norman D. Jarvis, of the technological staff of the Division, on methods of production used in the red snapper and grouper fishery at Pensacola to determine the possibility of introducing more efficient types of gear for catching these fishes. Experiments were conducted especially to determine the efficiency of small fish traps or pots and trawl lines. In this work it was found that a slightly modified type of the West Indian fish pot could catch red snapper in considerable numbers, the catch for a single pot running from 7 to 93 fish, with an average around 20 fish, in a 2-hour period. However, it was determined that trawl lines could not be fished successfully on most of the red-snapper fishing grounds even when modified to meet local conditions, but they might be used to advantage in certain areas for catching grouper.

A series of experimental cures of smoked red snapper were made in an effort to learn whether these fish would be suitable for marketing as a cured fish. As a result it was found that a smoked product of the finnan haddie type could be prepared. This product has an excellent flavor and keeps in good condition over a considerable period of time after preservation. The industry has adopted the method developed and is now marketing smoked red snapper on a small scale.

Mr. Jarvis also was detailed to aid the State of Florida in conducting experiments in preserving various locally caught fishery products for home use. This work was received with enthusiasm, for it has shown the fishery industry in the State the possibilities for expanding the market for local fish.

MARKET AND INDUSTRIAL SURVEYS

Market and industrial surveys are made to supply the trade with useful market information regarding the distribution and consumption of fishery products and to supply descriptive and economic data on our fisheries and fishery industries.

AQUATIC SHELL INDUSTRIES

During 1932 a survey was made of our oyster, marine-clam, freshwater mussel and marine-pearl shell industries by F. F. Johnson. The value of the products of these industries in 1932 was valued at nearly $8,000,000.

The high percentage of calcium carbonate content in oyster, marine-clam, and fresh-water mussel shells make the crushed product from them a valuable digestible feed for laying hens and growing chicks as well as an important agricultural liming material.

The production of crushed oyster shells for poultry feed in the past 12 years exceeded the 1932 production only in 1929 and 1930, although the value of the 1932 production was exceeded in each of the preceding 11 years. The production in the North and Middle Atlantic areas, while small, has remained fairly constant throughout the 12-year period for which annual statistics are available; the Chesapeake region has declined in production from a peak of nearly 120,000 tons in 1922 to less than 45,000 tons in 1932; the South Atlantic, not including Florida, reached a peak of 16,200 tons in 1927 and decreased to 10,400 tons in 1932; and the position of the Gulf States, including the Florida east coast, in oyster shell manufacture has increased rapidly in the past 12 years with exploitation of the vast supplies of reef shells. The production in Louisiana from 1927 to 1930, inclusive, has annually exceeded 100,000 tons, with some recession during the past 2 years, while the production in Florida in 1932 reached a peak of 61,000 tons. On the Pacific coast interest is being evidenced in exploiting the shells of the Japanese oyster which will supplement the west coast manufacture of products from currently accumulated oyster and clam shells, and reef and fossil deposits.

ESTABLISHING MARKETING GRADES FOR FISH

The Bureau, at the request of the State of Virginia, cooperated with the Virginia Bureau of Markets in a survey to determine the advisability and practicability of establishing marketing grades for fish and fishery products to assist the fishery industries in the more orderly marketing of their products. This was made by N. W. Broome, representing the State of Virginia, and J. R. Manning, representing the Bureau. Such agricultural products as potatoes, applies, watermelons, peanuts, tobacco, and others are now graded as to quality, and this has promoted efficiency in marketing these commodities. In these cases marketing grades or standards have been adopted which are of benefit to producers, dealers, and consumers. With agricultural products, grades are based largely on quality and size. It was believed that a similar grading system would be of value to the fishery industry, since considerable disorder and confusion exist in the marketing of fish.

In the conduct of the survey persons operating wholesale fish houses, hotels, and restaurants in Washington, D.C., and dealers and fishermen in the State of Virginia were interviewed as to their opinion on this matter. As a consequence it was found feasible to establish marketing grades and that a majority of the dealers and fishermen favored such a procedure. Accordingly, tentative grades for fresh fish and for salt-cured herring were devised and a grading system based on them was put into operation. Copies of the grades may be obtained from the Bureau of Markets, Richmond, Va.

FISHERY BYPRODUCTS INDUSTRIES OF MAINE

During the past year a technical and market survey was made of the fishery byproducts industries of Maine by Andrew W. Anderson and Roger W. Harrison.

As a result of this study it was found that in 1930 Maine byproducts industries prepared manufactured and semimanufactured products valued at $238,071. These consisted of herring (sardine) meal, herring oil, white-fish meal, cod and cod-liver oil, clam meal, fish glue, fish scale essence, and a quantity of salted ground fish skins. In addition, waste sold by canners to byproducts plants and pearl buttons cut from imported shells were reported as bringing various concerns a total of $123,374.

Raw materials from which byproducts can be manufactured are accumulated from the canning and smoking of herring; the evisceration and canning, smoking, salting, freezing, or packaging of cod, haddock, hake, pollock, flounders, and cusk; the shucking and canning of clams; the shucking of scallops; the picking of crabs and lobsters; the smoking and salting of alewives and mackerel; and trash fish.

The available waste material during 1930 from the various fishery industries amounted to over 44,500,000 pounds. Of this approximately 32,000,000 pounds were utilized by the 14 fish reduction, 16 oil rendering, and 1 pearl essence plants operating. Two additional fish reduction plants were capable of operation, but did not operate.

The greatest portion of the waste results from the canning and smoking of herring and is accumulated in Washington County. The second important source of waste, that from ground fish, is accumulated largely in Cumberland County along with considerable herring waste. Shellfish waste is accumulated largely in Knox and Washington Counties.

Maine byproducts plants are equipped for the manufacture of exceptionally high quality fish meals, and facilities are adequate for increased utilization of waste without additional investment.

In general it was found that herring oil and in many cases cod and cod-liver oil production methods need improvement and that clam waste and fish scale waste could be used to a much greater extent. In addition, cod-liver meal could be produced from "chum" from oil rendering operations.

A considerable quantity of scallop waste is available. This no doubt can be converted into a useful product. Also, a small production of crab scrap and lobster scrap is possible and an additional market for ground fish skins from fresh waste could be had by salting skins.

It was further determined that small accumulations of ground fish waste could be air-dried and that Maine fish meals due to their inherent value as a feed stuff should command a good market.

PUBLICATIONS OF THE DIVISION

During the calendar year 1932 the following publications were prepared by members of the Division. These do not include the monthly statistical bulletins of the landings of fishery products at Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash., nor the monthly reports on cold-storage holdings of frozen fish and quantities of fish frozen. The report entitled, "Studies in Crab Canning" was a contribution to the Bureau by Kokichi Oshima, of Japan. The fishery documents, reports, and circulars may be purchased at the prices shown from the Superintendent of Documents, Government Printing Office, Washington, D.C. The statistical bulle-

tins and special or S–memoranda are distributed free of charge upon request to the Bureau. The special articles may be obtained from the sources of publication.

Those wishing to receive current copies of this report and statistical bulletins issued by the Bureau should request that their names be placed on the Bureau's mailing lists no. 128 for the Annual Statistical Report, 128a for general statistical bulletins, and 128b for monthly cold-storage reports. Those desiring historical statistical data on the domestic fisheries for the period 1880 to 1929 should consult the report entitled "Fishery Industries of the United States, 1930," by R. H. Fiedler, Appendix II to the Report of the United States Commissioner of Fisheries for the fiscal year 1931. Figures for 1930 may be found in the report entitled "Fishery Industries of the United States, 1931," by R. H. Fiedler, Appendix II to Report of Commissioner of Fisheries for the fiscal year 1932.

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FIEDLER, R. H.
Fishery industries of the United States, 1931. Appendix II, Report of Commissioner, 1932. 8°, 343 pp. 20 cents.

FIEDLER, R. H., and NORMAN D. JARVIS.
Fisheries of the Virgin Islands of the United States. 8°, 32 pp., 10 figs. Investigational Report No. 14. 5 cents.

JARVIS, NORMAN D.
The fisheries of Puerto Rico. 8°, 41 pp., 8 figs. Investigational Report No. 13. 5 cents.

JOHNSON, F. F.
Some unusual markets for fish and shellfish. 8°, 13 pp., 3 figs. Fishery Circular No. 11. 10 cents.

LEMON, J. M.
Reducing the shrinkage of frozen fish in cold-storage. 8°, 12 pp., 2 figs. Investigational Report No. 9. 5 cents.
Developments in refrigeration of fish in the United States (with bibliography). 8°, 33 pp., 3 figs. Investigational Report No. 16. 5 cents.

OSHIMA, KOKICHI.
Studies in crab canning. 8°, 8 pp., 2 figs. Investigational Report No. 8. 5 cents.

TOLLE, CHESTER D., E. M. NELSON, and GEORGE S. JAMIESON.
Chemical and physical properties of burbot-liver oil and its vitamin content. 8°, 6 pp., 2 figs. Investigational Report No. 12. 5 cents.

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FIEDLER, R. H.
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MANNING, JOHN RUEL.
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MORRIS, H. P.
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Part 2. FISHERY STATISTICS, 1931

GENERAL REVIEW

The catch of fishery products in the United States and Alaska during 1931 decreased sharply from that in the previous year, the decrease in quantity amounting to 19 percent and in value 29 percent. The value of the production of canned fishery products decreased 24 percent as compared with that in the previous year; and by-products decreased sharply. There were also decreases in the production of packaged, frozen, and cured fishery products There was a decrease of 15 percent in the value of imports and 33 percent in the value of exports as compared with 1930.

During 1931 the domestic fisheries employed about 123,000 persons as fishermen, 4,200 on transporting craft, and about 78,000 were engaged in the wholesale and manufacturing industries, a total of about 200,000 persons, exclusive of duplication. The catch amounted to 2,657,317,000 pounds, valued at $77,344,000. This value, together with an estimated revenue of $3,136,000 received by persons on transporting craft and $45,483,000 received as salaries and wages by persons in wholesale and manufacturing establishments, makes a total of $125,963,000 as the income of primary handlers of fishery products.

In 1931, in the United States and Alaska, the production of canned fishery products amounted to 506,702,000 pounds, valued at $62,940,000, and the output by by-products was valued at $18,538,000. The production of fresh and frozen packaged fishery products amounted to 139,283,000 pounds, valued at $23,076,000. The production of cured fishery products amounted to 98,969,000 pounds, valued at $12,364,000. The pack of frozen fishery products in the entire United States and Alaska amounted to 112,257,000 pounds, estimated to be valued at $11,000,000, making the total value of all manufactured products in the entire United States and Alaska in 1931, about $128,000,000. It is estimated that about 600,000,000 pounds of fishery products valued at $47,000,000 were marketed fresh, making a total marketed value to primary handlers of all fishery products in 1931 of about $175,000,000.

Fishery products imported for consumption were valued at $43,033,000, while domestic exports were valued at $11,574,000.

New England States.—The 1931 statistics for the catch of these States show a decrease both in the volume and in the value of the catch as compared with any year for which there are records since 1924. The landings of fish by vessels at Boston and Gloucester, Mass., and Portland, Maine, also decreased appreciably under 1930, as did also the output of packaged fish. The production of frozen fish decreased about one fifth and the production of sardines in Maine declined sharply.

Middle Atlantic States.—The catch of fishery products of the Middle Atlantic States in 1931 was less in volume than in any preceding year for which data are available and the value of the catch was less than in any year since 1908. The landings of fish at New York, N.Y., and Groton, Conn., decreased somewhat under the 1930 landings. There was a considerable increase in the production of

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packaged fish, but a small decrease in the production of frozen fish. The catch of shad in the Hudson River increased appreciably in 1931 over 1930.

Chesapeake Bay States.—In 1931 the catch of fishery products in the Chesapeake Bay States was somewhat less than that in 1930, but exceeded the production in 1929; however, the value of the 1931 catch was less than that for any year for which there are records since 1897. There was a large increase in the catch of shad and alewives in the Potomac River as compared with 1930. The value of menhaden products was but little more than one half that of the preceding year.

South Atlantic and Gulf States.—The catch of fishery products in the South Atlantic and Gulf States in 1931 was less than in any year for which data are available since 1908 and the value is less than any year since 1902. There were decreases in the production of packaged fish, canned oysters, and menhaden products, although there was a small increase in the output of canned shrimp.

Pacific Coast States.—The catch statistics for the Pacific Coast States in 1931 show the smallest catch since 1926 and a value less than in any year since 1922. There was an increase in the pack of canned salmon, as the biennial heavy run of humpback or pink salmon occurred in 1931. There were large decreases in the packs of canned sardines, canned tuna, packaged fish, and frozen fish.

Lake States.—The United States fisheries prosecuted in the Great Lakes and the international lakes of northern Minnesota in 1931 decreased somewhat under the previous year. Beginning in 1929 a revised statistical procedure was used, including certain products not canvassed in some of the preceding surveys, and there was a change in the methods of collecting statistics in some of the States.

Mississippi River and tributaries.—The first survey for statistics of the catch of the Mississippi River and tributaries since 1922 was made for the year 1931. A considerable decrease in the catch is noted between these years, which is reflected principally in a smaller catch of fresh-water mussels, which are used primarily in pearl button manufacture.

Alaska.—The catch of fishery products in Alaska in 1931 was less in both volume and value than that in 1930; however, the pack of canned salmon in 1931 exceeded that of the previous year. There were decreases in the packs of frozen fish, cured fish, and in by-products.

Fisheries of the United States and Alaska, 1931

SUMMARY OF CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Product	New England, area XXII		Middle Atlantic, area XXIII		Chesapeake, area XXIII		South Atlantic and Gulf, areas XXIV and XXV		Pacific	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	496,088	13,817	113,401	2,950	186,412	2,872	166,810	3,393	584,437	12,203
Shellfish, etc	44,210	6,324	51,498	6,261	106,859	4,556	122,499	4,689	12,869	1,309
Total	540,298	20,141	164,899	9,211	293,271	7,428	289,309	8,082	597,306	13,512

NOTE.—The Roman numerals appearing under the names of the sections are the numbers given these areas by the North American Council on Fishery Investigations. It should be explained that there are included under these areas craft owned under the respective areas but at times fishing elsewhere.

Fisheries of the United States and Alaska, 1931—Continued

SUMMARY OF CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Product	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	90,068	5,990	44,062	2,258	595,956	9,923	2,277,234	53,406
Shellfish, etc	1,659	39	38,320	640	2,169	120	380,083	23,938
Total	91,727	6,029	82,382	2,898	598,125	10,043	2,657,317	77,344

OPERATING UNITS: BY SECTIONS

Item	New England	Middle Atlantic	Chesapeake	South Atlantic and Gulf [1]	Pacific
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5,880	3,925	2,106	2,895	6,454
On boats and shore	12,008	5,679	18,583	20,827	12,781
Total	17,888	9,604	20,689	23,722	19,235
Vessels:					
Steam	48	3	19	1	4
Net tonnage	7,658	326	2,104	65	103
Motor	654	457	104	529	932
Net tonnage	18,427	6,991	1,774	8,486	24,403
Sail	4	65	197	73	4
Net tonnage	31	1,636	2,230	936	1,628
Total vessels	706	525	320	603	940
Total net tonnage	26,116	8,953	6,108	9,487	26,134
Boats:					
Motor	5,026	1,875	8,483	5,854	5,383
Other	3,848	2,007	5,616	8,583	1,366
Accessory boats	1,250	198	76	175	
Apparatus:					
Haul seines	160	382	316	988	186
Purse seines	184	27	42	51	423
Lampara nets					209
Otter trawls (including all types and sizes)	566	164	27	2,255	
Beam trawls					55
Paranzella nets					20
Gill nets	12,396	2,838	17,906	14,030	4,448
Trammel nets				440	51
Pound nets, trap nets, and weirs	478	806	2,929	2,284	470
Stop nets		119	3	8	
Fyke nets	402	3,532	2,573	1,162	1,505
Bag nets and pocket nets	205				50
Other nets [3]	417	451	2,523	2,265	390
Hooks, baits or snoods	4,036,404	716,608	1,515,456	413,789	1,131,155
Fish wheels				24	32
Eel pots and traps	5,901	9,175	11,339	1,321	
Lobster pots	357,704	48,301			
Crab and crawfish pots, traps, drags, etc	2,681	61		3,526	16,689
Clam dredges	99	68		1	
Crab dredges		44	112	115	
Mussel dredges		4			
Oyster dredges	336	631	724	591	3
Scallop dredges and drags	3,878	1,069	1,216	201	
Crab scrapes			1,486		
Tongs, rakes, hoes, forks, grabs, etc	4,618	3,109	11,957	3,397	3,732
Abalone diving outfits					18
Sponge diving outfits				55	
Other apparatus [5]	3,378	255		4,880	7,400

[1] Includes the operating units used in the fisheries of Lake Okeechobee, Fla.
[3] Includes dip nets, cast nets, scap nets, reef nets, push nets, and other minor nets.
[5] Includes fish pots, harpoons, spears, gaffs, crab, sponge and crawfish hooks, periwinkle and cockle pots, picks, coquina scoops, and other apparatus not included in "Other nets."

Fisheries of the United States and Alaska, 1931—Continued

SUMMARY OF CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Item	Lakes	Mississippi River and tributaries	Alaska	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*
On vessels	1,697		[2] 8,914	31,871
On boats and shore	5,142	15,884		90,904
Total	6,839	15,884	8,914	122,775
Vessels:				
Steam	111			186
Net tonnage	2,393			12,649
Motor	394		582	3,652
Net tonnage	4,192		8,416	72,689
Sail				343
Net tonnage				6,461
Total vessels	505		582	4,181
Total net tonnage	6,585		8,416	91,799
Boats:				
Motor	1,756	4,426	1,318	34,121
Other	1,480	10,120	3,642	36,662
Accessory boats				1,699
Apparatus:				
Haul seines	316	1,013	143	3,504
Purse seines			468	1,195
Lampara nets				209
Otter trawls (including all types and sizes)				3,012
Beam trawls			10	65
Paranzella nets				20
Gill nets	104,101	101	4,596	160,416
Trammel nets	216	518		1,225
Pound nets, trap nets, and weirs	8,661	374	493	16,495
Stop nets				130
Fyke nets	2,437	32,541		44,152
Bag nets and pocket nets				255
Other nets [3]	1	191		6,238
Hooks, baits or snoods	852,871	2,459,179	[4]	11,125,462
Fish wheels			259	315
Eel pots and traps				27,736
Lobster pots				406,005
Shrimp nets and traps		438		438
Crab and crawfish pots, traps, drags, etc	3,680	18	450	27,105
Clam dredges				168
Crab dredges				271
Mussel dredges		440		444
Oyster dredges				2,285
Scallop dredges and drags				6,364
Crab scrapes				1,486
Tongs, rakes, hoes, forks, grabs, etc	196	3,994		31,003
Crowfoot bars (pairs)	416	4,480		4,896
Abalone diving outfits				18
Sponge diving outfits				55
Other apparatus [5]	1	3,781		19,695

[2] Includes persons in boat and shore fisheries.
[3] Includes dip nets, cast nets, scap nets, reef nets, push nets, and other minor nets.
[4] Number not determined.
[5] Includes fish pots, haapoons, graffs, crab, sponge and crawfish hooks, periwinkle and cockle pots, picks, coquina scoops, and other apparatus not included in "Other nets."

Fisheries of the United States and Alaska, 1931—Continued

CATCH: BY SECTIONS [6]

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf [7]		Pacific	
FISH	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Albacore	2	(8)								
Alewives	5,162	41	3,656	29	25,065	207	8,314	82		
Amberjack							6	(8)		
Anchovies									308	6
Barracuda							19	1	4,176	362
Black bass					19	2	482	45		
Bluefish	720	65	3,277	230	816	56	1,943	84		
Blue runner or hardtail							223	7		
Bonito	157	11	727	34	107	5	1	(8)		
Bowfin							10	(8)		
Buffalofish							54	(8)		
Butterfish	1,505	92	6,536	311	6,076	182	304	6		
Cabio or crab eater					(8)	(8)	10	(8)		
Cabrilla									228	9
Carp	24	2	389	43	349	22	260	15	158	6
Catfish and bullheads	79	1	88	8	1,016	42	4,297	181	371	48
Cero			2	(8)			7	1		
Cigarfish							36	1		
Cod	92,525	2,378	7,737	200	41	1			10,813	129
Corbina									2	(8)
Crappie							490	18		
Crevalle							81	2		
Croaker	499	15	1,875	66	13,299	263	4,511	63		
Cunner	453	19								
Cusk	6,509	111	4	(8)						
Dolphin									(8)	(8)
Drum:										
Black	1	(8)			198	4	1,361	39		
Red or redfish	1	(8)	5	(8)	33	1	2,535	115		
Eels	1,047	75	1,150	118	398	24	117	7	(8)	(8)
Flounders	41,838	1,423	10,612	416	1,283	60	1,312	95	11,423	553
Flyingfish									46	2
Frigate mackerel	1	(8)	4	(8)						
Garfish							1	(8)		
Gizzard shad					64	2	34	(8)		
Goosefish	13	(8)	5	(8)						
Grayfish	44	(8)	5	(8)					1,374	11
Groupers							2,794	73	22	1
Grunts			2	(8)			21	1		
Haddock	181,140	5,400	1,421	30	(8)	(8)				
Hake	16,671	269	242	4	25	1			13	(8)
Halibut	2,926	393	1	(8)					16,079	1,151
Hardhead									46	6
Harvestfish or "starfish"					1	(8)	48	1		
Herring:										
Round			57	4						
Sea	63,907	356	448	4					1,652	16
Hickory shad					67	2	237	8		
Hogfish	11	(8)	2	(8)	2	(8)				
Horse mackerel									562	17
Jewfish							18	1		
Kingfish (California)									414	10
Kingfish or "king mackerel"	(8)	(8)	59	3			3,420	164		
King whiting or "kingfish"	4	(8)	149	11	37	1	525	16		
Ladyfish							3	(8)		
Launce	241	2								
"Lingcod"									1,836	65
Mackerel	46,734	1,834	558	26	100	5			14,253	158
Marlin									24	1
Menhaden	5	(8)	40,567	181	112,920	368	76,906	118		
Minnows	24	10								
Mojarro							72	2		
Mullet	(8)	(8)	656	43	61	3	26,865	538	24	2
Mummichog	1	(8)	111	9						
Muttonfish							36	1		
Paddlefish							2	(8)		
Permit							5	(8)		
Pigfish					56	2	86	1		
Pike or pickerel	1	(8)	1	(8)	15	2	6	1		
Pilchard									300,204	1,185
Pilotfish			(8)	(8)						
Pinfish							67	2		

[6] Salt fish have been converted to the basis of round weight.
[7] Includes the catch of fish taken in Lake Okeechobee, Fla.
[8] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska, 1931—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Pollock	10,695	139	55	2						
Pompano					(8)	(8)	573	104	6	3
Porgies							47	1		
Rock bass									546	31
Rockfishes									7,736	260
Rosefish	237	3								
Rudderfish									41	3
Sablefish									2,373	76
Salmon:										
Atlantic	70	19								
Blueback, red, or sockeye									7,316	605
Chinook or king									39,634	2,527
Chum or keta									11,394	115
Humpback or pink									55,935	699
Silver or coho									19,081	684
Sculpin									92	8
Scup	3,196	116	8,599	177	454	17				
Sea bass	1,012	32	3,994	160	222	9	411	17	500	22
Sea bass, white (California)									1,398	116
Sea robin	130	2	103	1	1	(8)				
Shad	401	25	660	93	8,487	989	1,788	287	2,505	59
Sharks	140	2	30	1			970	3		
Sheepshead, Salt-water					1	(8)	1,062	26	198	6
Silversides			120	8						
Skates	867	8	84	1	4	(8)			175	4
Smelts	591	95	1	(8)					3,371	98
Snapper:										
Mangrove							114	3		
Red			3	(8)			6,207	425		
Snook							298	7		
Spadefish							1	(8)		
Spanish mackerel			234	34	14	1	4,998	208	24	3
Splittail									9	1
Spot	(8)	(8)	472	17	738	26	1,871	29		
Squawfish									3	(8)
Squeteagues or "sea trout":										
Gray	230	14	13,553	489	12,438	366	3,433	114		
Spotted	3	(8)			59	5	5,881	392		
Steelhead trout									3,564	173
Striped bass	90	14	135	24	1,116	159	327	35	995	96
Sturgeon	7	1	16	3	6	1	60	8	120	4
Suckers	160	10	126	12			9	(8)	1	(8)
Sunfish			2	(8)	1	(8)	599	18		
Surf fishes									305	14
Swordfish	3,211	591	106	23					358	49
Tai									1	(8)
Tautog	486	23	200	8	(8)	(8)				
Tenpounder							119	3		
Thimble-eyed mackerel			106	3	69	3				
Tilefish	1,637	65	1,022	30						
Tomcod	107	12	62	2	(8)	(8)			4	(8)
Tripletail							8	(8)		
Tuna and tunalike fishes:										
Albacore									37	3
Bluefin or horse mackerel	301	21	20	1					3,534	169
Bonito									3,080	49
Skipjack or striped									16,507	504
Yellowfin									36,580	1,979
Turbot							(8)	(8)		
Whitebait			23	2					156	7
Whitefish									220	12
White perch	11	1	442	54	531	27	328	13		
Whiting	8,071	81	2,735	27	1	(8)				
Wolffish	2,177	44								
Yellow perch	13	2	152	8	222	14	83	4		
Yellowtail							104	7	2,526	84
Miscellaneous fish									84	2
Total	496,088	13,817	113,401	2,950	186,412	2,872	166,810	3,393	584,437	12,203

[8] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska, 1931—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
SHELLFISH, ETC.	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Abalone									678	125
Clams:										
Cockle	136	13							22	5
Coquina							6	(8)		
Hard	4,811	699	2,646	738	743	254	1,128	67	460	22
Pismo									26	10
Razor	469	21	1	(8)					818	151
Soft	10,769	612	1,549	135					49	10
Surf	70	5	497	28						
Mixed									8	2
Conchs			55	2			4	(8)		
Crabs:										
Hard	934	56	274	15	58,894	805	7,709	94	4,294	334
King			5,105	11						
Soft	2	1	59	16	5,623	388	437	93		
Stone							143	9		
Crawfish									123	12
Lobsters:										
Common	11,312	2,719	1,149	292	(8)	(8)				
Spiny							456	42	1,340	223
Mussels, sea	117	7	174	8					(8)	(8)
Octopus							5	1	124	7
Oysters:										
Eastern, market, public	53	7	457	63	22,331	1,903	10,097	483	172	55
Eastern, market, private	4,013	814	21,090	2,702	9,980	881	4,778	311		
Eastern, seed, public	1,055	102	12,823	1,812	7,604	232				
Eastern, seed, private	4,563	549	735	78	45	1				
Western, market									205	162
Japanese, market									1,035	144
Periwinkles	118	8								
Scallops:										
Bay	1,698	428	1,042	107	1,226	79	508	51	6	2
Sea	1,081	135	1,252	101						
Shrimp	1	1	340	49			96,451	2,730	1,757	30
Squid	2,811	56	2,194	49	411	12			1,744	14
Terrapin			(8)	(8)	2	1	38	11	1	(8)
Turtles			4	(8)			74	3	7	1
Frogs							104	13		
Irish moss	89	5								
Sponges							561	781		
Bloodworms	55	50	21	25						
Sandworms	53	36	31	30						
Total	44,210	6,324	51,498	6,261	106,859	4,556	122,499	4,689	12,869	1,309
Grand total	540,298	20,141	164,899	9,211	293,271	7,428	289,309	8,082	597,306	13,512

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
FISH	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Albacore							2	(8)
Alewives							42,197	359
Amberjack							6	(8)
Anchovies							308	6
Barracuda							4,195	363
Black bass			14	2			515	49
Bluefish							6,756	435
Blue pike	12,679	539					12,679	539
Blue runner or hardtail							223	7
Bonito							992	50
Bowfin	7	(8)	428	9			445	9
Buffalofish	1	(8)	15,772	687			15,827	687
Butterfish							14,421	591
Burbot	464	6					464	6
Cabio or crab eater							10	(8)

8 Less than 500 pounds or dollars.

Fisheries of the United States and Alaska, 1931—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Cabrilla							228	9
Carp	4,180	119	11,892	455			17,252	662
Catfish and bullheads	718	47	10,267	878			16,836	1,205
Cero							9	1
Chubs	4,624	322					4,624	322
Cigarfish							36	1
Cisco	347	38					347	38
Cod					1,187	7	112,303	2,715
Corbina							2	(8)
Crappie	3	1	41	3			534	22
Crevalle							81	2
Croaker							20,184	407
Cunner							453	19
Cusk							6,513	111
Dolly Varden trout					71	6	71	6
Dolphin							(8)	(8)
Drum:								
Black							1,560	43
Red or redfish							2,574	116
Eels	45	2	7	1			2,764	227
Flounders					282	7	66,750	2,554
Flyingfish							46	2
Frigate mackerel							5	(8)
Garfish			73	1			74	1
Gizzard shad							98	2
Goldfish	80	2					80	2
Goosefish							18	(8)
Grayfish							1,423	17
Groupers							2,816	74
Grunts							23	1
Haddock							182,561	5,430
Hake							16,951	274
Halibut					22,695	1,353	41,701	2,897
Hardheads							46	6
Harvestfish or "starfish"							49	1
Herring:								
Lake	17,412	430					17,412	430
Round							57	4
Sea					103,567	777	169,574	1,153
Hickory shad							304	10
Hogfish							15	(8)
Horse mackerel							562	17
Jewfish							18	1
Kingfish (California)							414	10
Kingfish or "king mackerel"							3,479	167
King whiting or "kingfish"							715	28
Ladyfish							3	(8)
Lake trout	10,617	1,365					10,617	1,365
Launce							241	2
"Lingcod"					1	(8)	1,837	65
Mackerel							61,645	2,023
Marlin							24	1
Menhaden							230,398	667
Minnows			1	(8)			25	10
Mojarro							72	2
Mooneye	27	(8)	3	(8)			30	(8)
Mullet							27,606	586
Mummichog							112	9
Muttonfish							36	1
Paddlefish			951	43			953	43
Permit							5	(8)
Pigfish							142	3
Pike or pickerel			5	1			28	4
Pike (jacks)	390	20					390	20
Pilchard							300,204	1,185
Pilotfish							(8)	(8)
Pinfish							67	2
Pollock							10,750	141
Pompano							579	107
Porgies							47	1
Quillback			269	11			269	11
Rock bass	24	1					570	32
Rockfishes					35	1	7,771	261
Rosefish							237	3

[8] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska, 1931—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Rudderfish							41	3
Sablefish					411	13	2,784	89
Salmon:								
Atlantic							70	19
Blueback, red, or sockeye					162,052	3,996	169,368	4,601
Chinook or king					13,606	345	53,240	2,872
Chum or keta					59,331	457	70,725	572
Humpback or pink					215,331	2,619	271,266	3,318
Silver or coho					17,345	340	36,426	1,024
Sauger	2,442	107	2	1			2,444	108
Sculpin							92	8
Scup							12,249	310
Sea bass							6,139	240
Sea bass, white (California)							1,398	116
Sea robin							234	3
Shad							13,841	1,453
Sharks							1,140	6
Sheepshead:								
Fresh-water	1,633	42	3,905	143			5,538	185
Salt-water							1,261	32
Silversides							120	8
Skates							1,130	13
Smelts	86	4			2	(8)	4,051	197
Snapper:								
Mangrove							114	3
Red							6,210	425
Snook							298	7
Spadefish							1	(8)
Spanish mackerel							5,270	246
Splittail							9	1
Spot							3,081	72
Squawfish							3	(8)
Squeteagues or "sea trout":								
Gray							29,654	983
Spotted							5,943	397
Steelhead trout	1	(8)			40	2	3,605	175
Striped bass							2,663	328
Sturgeon	26	9					235	26
Sturgeon, shovelnose			87	8			87	8
Suckers	6,504	199	315	13			7,115	234
Sunfish	13	(8)	22	1			637	19
Surf fishes							305	14
Swordfish							3,675	663
Tai							1	(8)
Tautog							686	31
Tenpounder							119	3
Thimble-eyed mackerel							175	6
Tilefish							2,659	95
Tomcod							173	14
Tripletail							8	(8)
Tullibee	435	4					435	4
Tuna and tunalike fishes:								
Albacore							37	3
Bluefin or horse mackerel							3,855	191
Bonito							3,080	49
Skipjack or striped							16,507	504
Yellowfin							36,580	1,979
Turbot							(8)	(8)
White bass	418	17	3	(8)			421	17
Whitebait							179	9
Whitefish	10,761	1,646					10,981	1,658
Whitefish, Menominee	214	14					214	14
White perch							1,312	95
Whiting							10,807	108
Wolffish							2,177	44
Yellow perch	11,248	484					11,718	512
Yellow pike	4,669	572	5	1			4,674	573
Yellowtail							2,630	91
Miscellaneous fish							84	2
Total	90,068	5,990	44,062	2,258	595,956	9,923	2,277,234	53,406

[8] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska, 1931—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
SHELLFISH, ETC.	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Abalone							678	125
Clams:								
Cockle							158	18
Coquina							6	(8)
Hard					61	2	9,849	1,782
Pismo							26	10
Razor					1,047	61	2,335	233
Soft							12,367	757
Surf							567	33
Mixed							8	2
Conchs							59	2
Crabs:								
Hard					227	21	72,332	1,325
King							5,105	11
Soft							6,121	498
Stone							143	9
Crawfish	75	5	29	(8)			227	17
Lobsters:								
Common							12,461	3,011
Spiny							1,796	265
Mussels, sea							291	15
Mussel shells	1,584	31	37,254	422			38,838	453
Octopus							129	8
Oysters:								
Eastern, market, public							33,110	2,511
Eastern, market, private							39,861	4,708
Eastern, seed, public							21,482	2,146
Eastern, seed, private							5,343	628
Western, market							205	162
Japanese, market							1,035	144
Periwinkles							118	8
Scallops:								
Bay							4,480	667
Sea							2,333	236
Shrimp			49	4	834	36	99,432	2,850
Squid							7,160	131
Terrapin			19	(8)			60	12
Turtles			94	3			179	7
Frogs			875	131			979	144
Irish moss							89	5
Sponges							561	781
Bloodworms							76	75
Sandworms							84	66
Pearls and slugs		3		80				83
Total	1,659	39	38,320	640	2,169	120	380,083	23,938
Grand total	91,727	6,029	82,382	2,898	598,125	10,043	2,657,317	77,344

CATCH: BY STATES

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

States	Marine and coastal rivers		Mississippi River and tributaries		Lakes [9]		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alabama	6,168	223	1,822	33			7,990	256
Arkansas			15,733	412			15,733	412
California	430,997	7,108					430,997	7,108
Connecticut	45,770	2,016					45,770	2,016
Delaware	20,983	378					20,983	378
Florida	82,075	3,490			1,979	104	84,054	3,594
Georgia	7,350	251					7,350	251
Illinois			14,262	367	717	57	14,979	424
Indiana			7,718	157	799	49	8,517	206
Iowa			7,778	303			7,778	303

[8] Less than 500 pounds or dollars.

[9] Includes Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, Lake Superior, Rainy Lake, Namakan Lake, Lake of the Woods, Lake Okeechobee, and several mussel-bearing streams tributary to Lakes Huron and Michigan.

Fisheries of the United States and Alaska, 1931—Continued

CATCH: BY STATES—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

States	Marine and coastal rivers		Mississippi River and tributaries		Lakes		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Kansas			455	17			455	17
Kentucky			1,622	61			1,622	61
Louisiana	45,704	1,331	19,213	994			64,917	2,325
Maine	116,235	3,443					116,235	3,443
Maryland	66,634	2,706					66,634	2,706
Massachusetts	355,833	12,951					355,833	12,951
Michigan					32,313	2,938	32,313	2,938
Minnesota			3,498	138	8,362	294	11,860	432
Mississippi	22,985	595	2,650	123			25,635	718
Missouri			928	77			928	77
Nebraska			145	16			145	16
New Hampshire	775	67					775	67
New Jersey	92,846	5,854					92,846	5,854
New York	50,994	2,974			1,889	137	52,883	3,111
North Carolina	98,161	1,088					98,161	1,088
Ohio			185	7	26,719	1,213	26,904	1,220
Oklahoma			40	4			40	4
Oregon	25,819	1,282					25,819	1,282
Pennsylvania	76	5			5,058	316	5,134	321
Rhode Island	21,683	1,663					21,683	1,663
South Carolina	5,837	211					5,837	211
South Dakota			114	11			114	11
Tennessee			3,435	104			3,435	104
Texas	19,051	790	139	6			19,190	796
Virginia	226,637	4,722					226,637	4,722
Washington	140,491	5,122					140,491	5,122
Wisconsin			2,645	68	15,870	1,025	18,515	1,093
Alaska	598,125	10,043					598,125	10,043
Total	2,481,229	68,313	82,382	2,898	93,706	6,133	2,657,317	77,344

Yield of the fisheries of the United States, 1931: By gear

Gear	New England		Middle Atlantic		Chesapeake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	61,629,804	$1,630,272	43,176,649	$280,131	112,011,991	$416,026
Haul seines	1,829,187	68,404	3,966,162	147,259	2,498,935	130,360
Gill nets	20,280,597	633,360	3,560,142	253,010	2,543,367	253,124
Lines	113,066,678	3,384,059	10,923,000	382,808	50,716,000	704,019
Pound nets	12,994,597	265,971	36,703,495	1,145,181	67,024,148	1,960,020
Floating traps	10,780,044	303,788	370,511	14,910		
Weirs	33,067,730	149,022	1,539,999	3,548		
Stop nets			168,440	20,719	26,200	2,208
Fyke nets	293,338	17,457	1,599,869	71,397	925,372	47,453
Dip nets	6,960,694	81,632	84,947	17,534	2,750,984	168,964
Cast nets			3,270	399	16,376	1,476
Scap nets			158,684	9,923		
Bag nets	174,300	19,870				
Drag nets			99,790	21,522		
Push nets	122,265	31,213	14,750	1,475		
Pocket nets	1,600	240				
Otter trawls	233,693,841	6,668,552	16,451,487	553,144	1,235,420	48,868
Traps	105,300	1,886				
Pots	12,994,510	2,829,580	3,173,550	406,067	282,179	16,968
Harpoons	3,338,793	599,549	106,132	22,717		
Spears	182,294	15,945	208,354	22,898		
Scrapes, crab					4,095,027	227,556
Dredges	12,660,927	2,019,153	36,381,386	4,686,028	14,120,023	677,141
Tongs	2,554,000	422,730	3,369,731	680,031	34,031,680	2,646,801
Rakes	1,723,106	237,986	1,143,331	267,489	568,175	65,182
Forks	3,008,833	371,010	289,608	86,966		
Hoes	8,619,770	373,230	1,217,900	95,781		
Picks					76,872	27,900
Gaffs			845	156		
By hand	215,712	15,379	186,705	20,087	347,997	33,894
Total	540,297,920	20,140,288	164,898,737	9,211,180	293,270,746	7,427,960

Yield of the fisheries of the United States, 1931: By gear—Continued

Gear	South Atlantic and Gulf		Pacific		Lakes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	76,211,828	$123,442	187,788,389	$1,999,642		
Haul seines	21,440,656	663,094	5,654,582	317,736	4,696,700	$146,785
Gill nets	36,112,584	1,169,156	33,558,680	1,672,136	36,666,681	2,632,408
Trammel nets	4,693,894	224,153	674,069	65,408	119,977	3,039
Lines	23,329,896	938,141	117,489,156	5,386,909	2,312,722	299,795
Pound nets	10,422,145	307,856	35,337,624	1,080,290	15,379,128	1,053,263
Weirs	3,000	30	758,920	9,518		
Wheels	135,000	1,350	263,040	17,411		
Stop nets	646,849	11,935				
Fyke nets	566,851	27,789	364,161	44,998	3,725,931	206,951
Dip nets	476,296	30,673	2,573,757	78,389	290	11
Cast nets	90,820	4,125				
Bag nets			948,680	14,230		
Drag nets			149,689	5,386		
Reef nets			132,859	3,008		
Lampara nets			188,565,521	944,121		
Paranzella nets			11,970,869	528,194		
Otter trawls	96,293,848	2,724,819				
Beam trawls			1,180,210	26,388		
Traps	50,000	750	6,040,412	582,469	27,166,681	1,647,174
Pots	987,834	65,480			75,130	4,508
Harpoons			383,605	49,938		
Spears	193,597	17,343			82	5
Dredges	6,339,018	300,867				
Tongs	6,794,829	480,175	[2] 2,794,709	[2] 561,634	24,622	312
Crowfoot bars					1,142,349	25,307
Rakes	499,093	46,260				
Forks	[3] 229,588	[3] 10,115				
Grabs	2,471,740	58,331				
Picks					310,255	7,150
Hooks	281,770	242,035				
Diving apparatus, abalone, or sponge	283,151	539,285	677,580	124,404		
By hand	755,214	94,730			106,297	2,539
Total	289,309,501	8,081,934	597,306,512	13,512,209	91,726,845	6,029,247

Gear	Mississippi River and tributaries		Total	
	Pounds	*Value*	*Pounds*	*Value*
Purse seines			480,818,661	$4,449,513
Haul seines	13,739,657	$574,541	53,825,879	2,048,179
Gill nets	166,598	6,547	132,888,649	6,619,741
Trammel nets	1,134,206	75,615	6,622,146	368,215
Lines	10,140,037	772,245	327,977,489	11,867,976
Pound nets	224,275	9,541	178,085,412	5,822,122
Floating traps			11,150,555	318,698
Weirs			35,369,649	162,118
Wheels			398,040	18,761
Stop nets			841,489	34,862
Fyke nets	18,507,204	797,130	25,982,726	1,213,175
Dip nets	30,045	3,307	12,877,013	380,510
Cast nets			110,466	6,000
Scap nets			158,684	9,923
Bag nets			1,122,980	34,100
Drag nets			249,479	26,908
Push nets			137,015	32,688
Pocket nets			1,600	240
Reef nets			132,859	3,008
Lampara nets			188,565,521	944,121
Paranzella nets			11,970,869	528,194
Otter trawls			347,674,596	9,995,383
Beam trawls			1,180,210	26,388
Traps	77,751	4,215	33,440,144	2,236,494
Pots	[1] 232,704	[1] 22,062	17,745,907	3,344,665
Harpoons			3,828,530	672,204
Spears	2,250	270	586,577	56,461
Scrapes, crab			4,095,027	227,556
Dredges	3,699,100	40,958	73,200,454	7,724,147
Tongs	1,601,876	21,091	51,171,447	4,812,774
Crowfoot bars	20,893,550	265,443	22,035,899	290,750
Rakes	370,130	4,029	4,303,835	620,946
Forks	4,812,737	76,214	8,340,766	544,305
Hoes			9,837,670	469,011
Grabs	873,099	130,621	3,344,839	188,952
Picks			387,127	35,050
Gaffs			845	156
Hooks			281,770	242,035
Diving apparatus, abalone, or sponge			960,731	663,689
By hand	5,877,304	93,528	7,489,229	260,157
Total	82,382,523	2,897,357	2,059,192,784	67,300,175

[1] Includes baskets. [2] Includes shovels, rakes, and dredges. [3] Includes coquina scoops.

Industries related to the fisheries of the United States and Alaska, 1931

Item	New England	Middle Atlantic	Chesapeake	South Atlantic and Gulf	Pacific
Transporting:					
Persons engaged:					
On vessels	307	77	857	354	274
On boats	16	167	----------	389	----------
Total	323	244	857	743	274
Vessels:					
Steam	1	1	----------	----------	----------
Net tonnage	26	36	----------	----------	----------
Motor	117	28	415	152	106
Net tonnage	1,857	419	5,231	1,440	2,335
Sail	----------	----------	9	30	----------
Net tonnage	----------	----------	267	279	----------
Total vessels	118	29	424	182	106
Total net tonnage	1,883	455	5,498	1,719	2,335
Boats	8	134	----------	251	----------
Wholesale and manufacturing:					
Establishments	436	418	564	585	316
Persons engaged:					
Proprietors	302	393	910	700	396
Salaried employees	966	963	389	352	777
Wage earners:					
Average for season	9,005	3,633	11,034	12,583	10,478
Average for year	4,307	2,795	4,713	4,581	3,958
Salaries and wages paid	$7,113,463	$7,042,586	$2,802,420	$2,821,543	$6,750,607
Manufactured products [4]	$18,616,951	$12,451,810	$7,905,626	$8,374,588	$28,488,079
Fishermen's manufactured products:					
Persons engaged	3,012	672	76	1,379	149
Products	$830,915	$311,704	$5,987	$258,805	$164,434

Item	Lakes	Mississippi River and tributaries	Alaska	Total
Transporting:				
Persons engaged:				
On vessels	19	29	1,668	3,585
On boats	----------	----------	[1]	572
Total	19	29	1,668	4,157
Vessels:				
Steam	----------	----------	17	19
Net tonnage	----------	----------	30,560	30,622
Motor	9	8	382	1,217
Net tonnage	120	104	12,616	24,122
Sail	----------	----------	----------	39
Net tonnage	----------	----------	----------	546
Total vessels	9	8	399	1,275
Total net tonnage	120	104	43,176	55,290
Boats	----------	----------	[2] 836	1,229
Wholesale and manufacturing:				
Establishments	230	217	226	2,992
Persons engaged:				
Proprietors	225	204		
Salaried employees	471	355	11,995	[3]
Wage earners:				
Average for season	1,506	4,275		
Average for year	1,034	3,483	[3]	[3]
Salaries and wages paid	$2,610,439	$3,080,430	[3]	[3]
Manufactured products [4]	$1,659,217	$6,357,622	$31,682,519	$115,536,412
Fishermen's manufactured products:				
Persons engaged	106	216	[5]	[5]
Products	$63,844	$8,751	[5]	[5]

[1] Included on vessels.
[2] Includes scows, houseboats, pile drivers, etc.
[3] Detailed statistics not available.
[4] The production of manufactured products in 1931 and 1930 is not comparable with that shown in previous bulletins since fresh and frozen packaged fishery products are now included.
[5] Data not available.

NOTE.—Of the total number of persons engaged in the preparation of fishermen's manufactured products 4,159 have also been included as fishermen and 395 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

MANUFACTURED FISHERY PRODUCTS

Statistics on the products of the various manufactured fishery enterprises have been collected more completely for the years 1930 and 1931 than for any previous years. In addition to statistics on the production of cured fishery products, canned fishery products and byproducts, data were also collected and are presented herewith which indicate the output of all packaged fishery products, including shucked oysters, crab meat, and the like.

It should be explained that the statistics for 1931 which are presented herewith include the entire production for the United States and Alaska, whereas those for 1930 omitted the production in the Mississippi River and tributaries.

Manufactured fishery products of the United States and Alaska, 1931 [1]

Item	Quantity	Value
Alewives:		
Salted:		
Round in brine—pounds	1,251,233	$31,475
Corned—do	4,165,637	68,579
Tight-pack cut—do	5,485,190	157,685
Tight-pack roe—do	241,150	11,529
Pickled and spiced—do	2,471,635	78,129
Smoked—do	559,464	21,661
Canned—standard cases	34,620	78,973
Roe, canned—do	32,740	132,073
Dry scrap—tons	665	22,863
Oil—gallons	17,696	2,778
Barracuda, fresh fillets—pounds	290,000	53,500
Blue pike:		
Fresh fillets—do	1,213,129	236,775
Frozen fillets—do	446,386	87,644
Buffalofish, smoked—do	687,245	234,436
Butterfish, smoked—do	739,618	188,269
Cabrilla, fresh fillets—do	35,000	5,500
Carp, smoked—do	98,382	34,700
Cisco, chubs, and tullibee, smoked—do	6,331,125	1,741,380
Cod:		
Fresh sticks—do	219,130	41,384
Fresh fillets—do	6,572,157	840,784
Frozen fillets—do	1,929,508	235,506
Salted:		
Dry—do	1,864,066	115,219
Boneless—do	12,204,671	1,047,236
Pickled—do	146,398	4,471
Stockfish—do	119,300	11,930
Smoked—do	38,000	6,010
Smoked fillets—do	642,352	96,117
Oil, cod and cod-liver—gallons	97,651	63,045
Croaker, fresh pandressed—pounds	40,900	4,229
Cusk:		
Fresh sticks—do	189,250	32,725
Fresh fillets—do	444,304	57,544
Frozen fillets—do	10,025	1,086
Salted, boneless—do	111,440	3,539
Smoked fillets—do	857,212	134,864
Eels:		
Salted—do	71,300	4,602
Smoked—do	106,463	33,910
Flounders:		
Fresh, pandressed—do	30,900	4,053
Fresh fillets—do	5,823,609	946,671
Frozen fillets—do	49,076	7,982
Groupers:		
Fresh and frozen steaks—do	136,000	19,320
Frozen fillets—do	18,000	2,880

[1] The figures in the above table do not check in all instances with figures on certain manufactured products shown in the report for 1931. This is due to the fact that the above figures were obtained as the result of a more detailed survey, and several firms' production is included which is not shown in the previous report. The figures herewith include the production of every primary firm in the United States and Alaska manufacturing fishery products or by-products as shown above which operated in 1931 to the knowledge of the Bureau. Data on the production of green-salted ground fish also are not included in this tabulation, since these products are intermediate to other products which are included, and also complete statistics on the green-salted fish are not available.

NOTE.—Some of the above products may have been manufactured from products imported from another country; therefore, they cannot be correlated directly with the catch within the United States and Alaska.

Manufactured fishery products of the United States and Alaska, 1931—Continued

Item	Quantity	Value
Haddock:		
Fresh and frozen pandressed ... pounds	219,198	$27,570
Fresh sticks ... do	77,800	14,920
Fresh fillets ... do	30,137,035	4,535,659
Frozen fillets ... do	11,876,821	1,573,469
Salted, boneless ... do	383,450	26,421
Smoked ... do	61,500	11,245
Smoked fillets ... do	506,637	89,761
Finnan haddie ... do	2,282,179	279,924
Hake:		
Fresh sticks ... do	219,500	31,115
Fresh fillets ... do	3,336,676	385,891
Frozen fillets ... do	131,664	12,231
Salted, boneless ... do	488,530	15,786
Smoked fillets ... do	11,500	1,445
Halibut:		
Fresh and frozen pandressed ... do	382,680	65,348
Fresh fillets ... do	60,000	18,000
Frozen fillets ... do	103,110	14,313
Smoked ... do	36,860	8,691
Herring, lake:		
Salted ... do	4,252,250	102,925
Smoked ... do	650,748	61,081
Herring, sea:		
Salted ... do	242,130	11,813
Roused ... do	92,400	4,266
Spiced ... do	35,795	5,517
Scotch-cure ... do	8,011,050	473,807
Norwegian-cure ... do	160,500	10,811
Miscellaneous, pickled ... do	2,798,100	50,992
Smoked:		
Boneless ... do	1,480,569	124,964
Bloaters ... do	2,258,617	133,932
Lengthwise ... do	98,108	5,318
Medium-scale ... do	205,015	11,570
Kippered ... do	274,653	50,355
Miscellaneous ... do	490,650	67,897
Canned, "sardines" ... standard cases	885,408	2,647,187
Meal ... tons	9,498	310,082
Oil ... gallons	2,242,109	388,671
Scales ... pounds	184,696	5,588
Lake trout, smoked ... do	376,834	96,357
Mackerel:		
Fresh fillets ... do	39,049	7,726
Salted:		
Fillets ... do	1,058,300	133,697
Split ... do	1,292,311	100,861
Smoked ... do	278,007	49,162
Canned ... standard cases	102,392	246,848
Menhaden:		
Acid scrap ... tons	4,943	86,393
Dry scrap ... do	19,044	620,014
Meal ... do	1,710	66,643
Oil ... gallons	1,948,040	298,198
Mullet:		
Frozen fillets ... pounds	19,000	2,800
Salted ... do	1,191,362	48,102
Roe, salted ... do	74,704	17,350
Paddlefish roe, salted ... do	1,595	812
Pilchard:		
Canned, "sardines" ... standard cases	1,713,407	4,715,089
Meal ... tons	16,319	610,462
Oil ... gallons	3,916,336	807,647
Pollock:		
Fresh fillets ... pounds	314,604	28,271
Frozen fillets ... do	131,319	15,151
Salted:		
Dry ... do	222,100	4,779
Boneless ... do	226,740	6,998
Rockfishes, fresh fillets ... do	1,350,000	219,500
Sablefish:		
Salted ... do	96,535	4,626
Smoked ... do	57,320	17,684
Kippered ... do	768,445	88,166
Salmon:		
Fresh and frozen fillets ... do	357,317	49,550
Salted, dry or hard ... do	1,660,187	35,089
Dried ... do	1,240,000	74,600
Mild-cured [2] ... do	10,159,650	1,550,048
Salted bellies and pickled ... do	1,287,763	146,898

[2] These are intermediate products and in the case of mild-cured salmon are used largely in the production of smoked and kippered salmon and in the case of button blanks are used in the manufacture of buttons.

Manufactured fishery products of the United States and Alaska, 1931—Continued

Item	Quantity	Value
Salmon—Continued.		
Kippered—pounds	1,966,333	$246,653
Smoked—do	7,787,560	2,270,374
Canned—standard cases	6,740,045	38,083,176
Meal—tons	2,435	108,682
Oil—gallons	250,871	41,129
Eggs:		
For food, canned—standard cases	3,360	30,486
For bait, canned—do	5,246	149,186
Sauger, fresh and frozen fillets—pounds	18,880	3,495
Sea bass (Pacific coast):		
Black, fresh fillets—do	85,000	10,500
White, fresh fillets—do	350,000	75,000
Totuava, fresh fillets—do	200,000	40,000
Shad:		
Smoked—do	147,219	31,776
Canned—standard cases	747	2,091
Roe, canned—do	2,100	63,060
Sharks, hides or skins—pounds	31,800	3,360
Sheepshead, smoked—do	617	77
Snapper, red:		
Fresh and frozen steaks—do	80,193	14,161
Fresh and frozen fillets—do	66,500	14,375
Spanish mackerel, frozen fillets—do	15,500	3,140
Spot, salted—do	63,500	2,601
Squeteagues:		
Frozen pandressed—do	214,300	17,154
Fresh fillets—do	384,200	41,104
Frozen fillets—do	22,500	6,950
Sun-dried—do	33,148	6,166
Sturgeon, smoked—do	1,767,676	1,186,445
Sturgeon roe:		
Salted—do	1,399	1,440
Caviar, canned—standard cases	4,630	609,502
Tuna and tunalike fishes:		
Fresh fillets—pounds	50,000	9,000
Canned—standard cases	1,216,976	7,279,392
Meal—tons	5,078	169,505
Oil—gallons	15,939	3,296
Whitefish:		
Fresh fillets—pounds	15,310	3,240
Smoked—do	1,179,431	295,004
Caviar, canned—standard cases	474	12,879
Whiting, smoked—pounds	600	30
Wolffish, fresh fillets—do	42,929	5,468
Yellow perch:		
Fresh fillets—do	1,036,323	178,751
Frozen fillets—do	160,672	30,767
Crabs, blue:		
Meat, packaged, fresh-cooked—do	6,779,990	1,749,952
Canned—standard cases	778	14,921
Crabs, blue and king, dry scrap—tons	3,150	58,806
Lobsters, meat, packaged, fresh-cooked—pounds	124,052	136,542
Shrimp:		
Fresh-packaged—do	1,874,000	262,960
Frozen-packaged—do	213,354	32,024
Sun-dried—do	1,422,387	318,306
Cooked and peeled—do	1,671,455	322,688
Canned—standard cases	821,375	3,982,247
Meal or bran—tons	1,289	25,090
Spiny lobster, whole, fresh-cooked—pounds	1,111,500	259,330
Abalone, steaks—do	578,683	185,178
Clams, hard:		
Fresh-shucked—gallons	95,926	230,200
Canned:		
Whole—standard cases	23,671	135,025
Chowder—do	231,350	848,928
Minced—do	8,388	55,971
Broth—do	4,216	23,037
Juice—do	6,034	25,817
Cocktail—do	700	11,274
Clams, razor:		
Fresh-shucked—gallons	47,046	19,132
Canned:		
Whole—standard cases	4,063	39,890
Minced—do	73,078	634,547
Juice—do	364	1,120

Manufactured fishery products of the United States and Alaska, 1931—Continued

Item	Quantity	Value
Clams, soft:		
Fresh-shucked ---- gallons	256,495	$314,122
Canned:		
Whole ---- standard cases	98,465	341,963
Chowder ---- do	46,003	112,677
Juice or bouillon ---- do	14,100	33,569
Clams, surf or skimmer, fresh-shucked ---- gallons	1,000	2,000
Marine-shell products:		
Buttons ---- gross	4,399,512	2,995,500
Novelties		664,754
Mussels, fresh-water, shell products:		
Blanks [2] ---- gross	12,835,671	2,232,520
Buttons ---- do	14,598,234	4,041,080
Novelties		93,892
Lime ---- tons	2,574	2,825
Poultry feed ---- do	11,932	94,246
Miscellaneous products ---- do	23,813	98,190
Oysters:		
Eastern:		
Fresh-shucked ---- gallons	5,323,036	8,045,179
Canned ---- standard cases	298,348	922,720
Japanese:		
Fresh-shucked ---- gallons	94,188	171,145
Canned ---- standard cases	7,930	40,805
Native, Pacific, fresh-shucked ---- gallons	21,209	155,821
Shell products:		
Poultry feed ---- tons	263,145	1,840,333
Lime ---- do	41,762	138,527
Lime, "burned" ---- do	11,207	85,884
Scallops, bay, fresh-shucked ---- gallons	467,922	777,073
Scallops, sea, fresh-shucked ---- do	241,379	271,522
Alligator hides ---- pounds	88,356	7,363
Unclassified products:		
Pandressed, fresh and frozen [3] ---- do	175,095	26,604
Steaks, fresh and frozen [4] ---- do	60,000	14,440
Fillets, fresh and frozen [5] ---- do	202,015	30,634
Miscellaneous, packaged, fresh and frozen [6] ---- do	250,265	37,622
Salted [7] ---- do	942,766	34,072
Spiced [8] ---- do	8,590	1,585
Smoked [9] ---- do	102,795	20,344
Canned:		
Fish for cat and dog food ---- standard cases	52,509	143,345
Fish cakes, balls, etc ---- do	103,704	779,411
Fish flakes ---- do	28,486	514,553
Other [10] ---- do	24,943	228,117
Dry scrap ---- tons	941	25,830
Meal [11] ---- do	14,272	782,618
Oil [12] ---- gallons	45,040	11,623
Glue ---- do	432,480	1,042,190
Other by-products [13]	124,493	688,381
Total, fresh and frozen packaged products ---- pounds	139,282,621	23,076,370
Total, cured products ---- do	98,968,945	12,364,364
Total, canned ---- do	506,702,116	62,939,879
Total, by-products		18,538,008
Grand total		116,918,621

[2] See footnote on p. 177.

[3] Includes butterfish, cod, pinfish, pompano, salmon, sea bass (Atlantic coast), sheepshead, Mangrove snapper, spot, and wolffish.

[4] Includes cabio, red drum, halibut, salmon, snook, and tripletail.

[5] Includes amberjack, bluefish, croaker, red drum, jewfish, lake herring, lake trout, mackerel, sea bass (Atlantic coast), snook and yellow pike.

[6] Includes fresh alewife roe; frozen mullet roe, smelt, and scallops; barracuda fish cakes; sablefish sausage, fresh-shucked conchs; and steamed soft clams.

[7] Includes anchovies, barracuda, bluefish, corbina, cusk, haddock, hake, lake trout, mackerel, pilchard, black sea bass, Spanish mackerel, and tuna; pickled Dolly Varden trout; and mild-cured shad.

[8] Includes pilchard and salmon.

[9] Includes cusk, flounders, hake, sea herring (Bismark), paddlefish, pilchard, suckers, and certain imported species.

[10] Includes pickled eels, haddock fillets, haddock chowder, finnan haddie, smoked salmon, shrimp gumbo soup, abalone, pickled mussels, squid, terrapin meat and soup, turtle meat and soup, miscellaneous fish eggs for food, and miscellaneous canned fish.

[11] Includes meal from mackerel, salmon fry, clams, and mixed species.

[12] Includes mackerel and shark oil, tanner's oil and oil from mixed species.

[13] Includes agar agar, green fish scrap, fish flour, fish paste, herring pomace, kelp by-products, ground clam shells, and marine-shell blanks.

FISHERIES OF THE NEW ENGLAND STATES

(Area XXII)[3]

The yield of the fisheries of the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) during 1931 amounted to 540,297,920 pounds, valued at $20,140,288. This is a decrease of 23 percent in the volume of the catch and 27 percent in its value as compared with the catch and its value in the preceding year. Of the total catch in 1931, 496,088,445 pounds valued at $13,817,156 were fish and 44,209,475 pounds valued at $6,323,132 were shellfish and miscellaneous products. These fisheries gave employment to 17,888 fishermen, which is an increase of 5 percent as compared with the number of fishermen in 1930. Of the total number of fishermen, 5,880 regular fishermen were employed on vessels and 8,021 regular and 3,987 casual fishermen were employed in the boat and shore fisheries.

Fisheries of the New England States, 1931

SUMMARY OF CATCH

Product	Maine		New Hampshire		Massachusetts	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	100, 560, 305	$1, 454, 083	631, 929	$16, 725	342, 300, 784	$10, 811, 520
Shellfish, etc	15, 675, 119	1, 989, 271	143, 289	50, 151	13, 533, 039	2, 139, 488
Total	116, 235, 424	3, 443, 354	775, 218	66, 876	355, 833, 823	12, 951, 008

Product	Rhode Island		Connecticut		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	14, 438, 070	$511, 678	38, 157, 357	$1, 023, 150	496, 088, 445	$13, 817, 156
Shellfish, etc	7, 244, 936	1, 151, 170	7, 613, 092	993, 052	44, 209, 475	6, 323, 132
Total	21, 683, 006	1, 662, 848	45, 770, 449	2, 016, 202	540, 297, 920	20, 140, 288

OPERATING UNITS: BY STATES

Item	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	454		4, 403	233	790	5, 880
On boats and shore:						
Regular	3, 862	60	2, 945	822	332	8, 021
Casual	1, 082	36	1, 832	416	621	3, 987
Total	5, 398	96	9, 180	1, 471	1, 743	17, 888
Vessels:						
Steam			21	3	24	48
Net tonnage			3, 133	126	4, 399	7, 658
Motor	78		396	77	103	654
Net tonnage	937		15, 224	793	1, 473	18, 427
Sail			1		3	4
Net tonnage			6		25	31
Total vessels	78		418	80	130	706
Total net tonnage	937		18, 363	919	5, 897	26, 116

[3] This is the number given this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area craft owned in the area but at times fishing elsewhere. Notable examples are the ground fish fishery in area XXI and the mackerel and southern trawl fisheries in areas XXIII and XXIV.

Fisheries of the New England States, 1931—Continued

OPERATING UNITS: By States—Continued

Item	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	2,418	57	1,706	513	332	5,026
Other	1,292	1	1,619	573	363	3,848
Accessory boats	190		947	42	71	1,250
Apparatus:						
Purse seines:						
Mackerel	6		106	2	6	120
Length, yards	1,880		50,318	320	642	53,160
Other	62		1		1	64
Length, yards	14,050		150		400	14,600
Haul seines	56	1	19	16	68	160
Length, yards	5,920	100	3,055	2,075	3,646	14,796
Gill nets:						
Anchor	1,505		1,373			2,878
Square yards	446,172		487,803			933,975
Drift	4		9,316	126	51	9,497
Square yards	1,200		3,097,864	44,640	125,023	3,268,727
Runaround				11		11
Square yards				13,100		13,100
Stake					10	10
Square yards					4,360	4,360
Lines:						
Hand	4,630	144	533	373	318	5,998
Hooks	4,833	144	759	539	381	6,656
Trawl	29,932	620	47,936	1,562	912	80,962
Hooks	1,496,890	31,000	2,383,422	75,380	43,056	4,029,748
Pound nets	1		132	54	18	205
Floating traps	24		20	63		107
Weirs	160		6			166
Fyke nets	71		49	154	128	402
Dip nets	88		94	28	45	255
Bag nets	201					201
Push nets			156	6		162
Pocket nets	4					4
Otter trawls	33		322	81	130	566
Yards at mouth	856		9,760	2,230	3,413	16,259
Box traps	5		3			8
Pots:						
Crab	1,049		1,620		12	2,681
Eel	402		1,963	1,839	1,689	5,893
Lobster	220,140	3,825	72,914	40,777	20,048	357,704
Periwinkle and cockle			1,015	1,690		2,705
Harpoons	61	2	130	62	19	274
Spears	31		273	33	62	399
Dredges:						
Oyster			20	32	284	336
Yards at mouth			21	47	276	344
Scallop	77		3,228	573		3,878
Yards at mouth	136		2,602	442		3,180
Clam			88	11		99
Yards at mouth			44	5		49
Tongs			218	489	185	892
Rakes			762	86	41	889
Forks			864	30	10	904
Hoes	1,472		440	13	8	1,933

Fisheries of the New England States, 1931—Continued

CATCH: BY STATES

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore							1,900	$38			1,900	$38
Alewives	2,795,895	$17,877			2,212,019	$22,102	126,728	1,082	27,484	$640	5,162,126	41,701
Bluefish	540	16			191,039	19,810	121,091	12,052	407,528	33,230	720,198	65,108
Bonito	104,158	7,542			30,735	2,333	21,485	1,262	371	19	156,749	11,156
Butterfish					733,013	51,298	752,700	39,115	19,526	1,473	1,505,239	91,886
Carp					855	43			23,596	2,662	24,451	2,705
Catfish and bullheads	26,344	276			37,000	370			15,236	325	78,580	971
Cod	12,652,470	297,996	60,000	$1,540	73,277,923	1,915,290	905,012	33,704	5,629,166	129,906	92,524,571	2,378,436
Croaker	612	15			498,493	15,480					499,105	15,495
Cunners					349,751	15,595	103,000	3,490	100	20	452,851	19,105
Cusk	1,387,671	23,373	16,860	169	5,066,900	88,403			38,031	799	6,509,462	112,744
Drum:												
Black					880	10					880	10
Red					433	7			189	2	622	9
Eels	194,451	12,578			378,194	23,769	302,663	22,407	171,689	16,707	1,046,997	75,461
Flounders	1,328,019	40,388	7,480	222	25,720,071	1,041,654	6,084,490	145,296	8,697,637	195,912	41,837,697	1,423,472
Frigate mackerel							1,200	20			1,200	20
Goosefish					150	2			12,400	62	12,550	64
Grayfish					44,330	454					44,330	454
Haddock	11,694,221	360,065	240,730	9,629	150,431,171	4,556,612	352,339	13,273	18,421,485	461,256	181,139,946	5,400,835
Hake	5,643,587	63,009	252,860	3,324	10,161,150	191,571	43,095	779	570,305	10,584	16,670,997	269,267
Halibut	93,704	12,995			2,776,886	371,225			55,638	8,952	2,926,228	393,172
Herring, sea	55,784,870	255,863	8,000	120	7,879,169	95,807	235,155	4,167			63,907,194	355,957
Hogfish					10,749	216					10,749	216
Kingfish or "king mackerel"					199	5					199	5
King whiting or "kingfish"	515	20			3,074	101			912	29	4,501	150
Launce					241,200	2,474					241,200	2,474
Mackerel	5,421,838	148,728			39,458,476	1,630,402	1,423,150	43,981	430,687	12,019	46,734,151	1,835,130
Menhaden							3,477	43	1,700	17	5,177	60
Minnows					1,250	375			23,085	9,795	24,335	10,170
Mullet					223	13					223	13
Mummichog									1,300	351	1,300	351
Pike or pickerel									400	42	400	42
Pollock	1,879,508	15,193	34,100	341	7,920,445	113,318	82,531	1,306	778,080	9,626	10,694,664	139,784
Rosefish	9,755	101			223,412	2,889			4,090	72	237,257	3,062
Salmon	70,190	18,824			38	8					70,228	18,832
Scup or porgy					1,952,867	58,462	1,177,400	57,236	65,505	1,387	3,195,772	117,085
Sea bass					771,149	22,353	41,938	2,619	199,000	6,760	1,012,087	31,732
Sea robin					150	4	101,200	1,256	28,670	296	130,020	1,556
Shad	157,763	3,592			150,478	7,136	17,970	1,093	75,114	13,307	401,325	25,128
Sharks	73,925	1,085			62,748	559	3,000	30	245	5	139,918	1,679
Skates					53,090	468	614,271	5,570	199,196	1,525	866,557	7,563

Smelt	567,422	90,587	6,000	1,200	4,780	929	10,840	2,168	2,150	443	591,192	95,327
Spot					40	1					40	1
Squeteagues or "sea trout":												
Gray	45	2			149,967	6,342	52,150	4,636	28,123	2,546	230,285	13,526
Spotted					2,737	281					2,737	281
Striped bass					47,600	8,316	39,026	5,663	3,741	497	90,367	14,476
Sturgeon	1,061	176			5,394	718	200	22	31	9	6,686	925
Suckers	53,675	3,875							106,575	5,704	160,250	9,579
Swordfish	343,038	70,812			2,157,820	421,866	456,158	74,439	253,738	24,882	3,210,754	591,999
Tautog					186,801	8,454	248,650	11,573	50,106	2,649	485,557	22,676
Tilefish									1,636,943	65,044	1,636,943	65,044
Tomcod	68,650	604			31,900	319	4,200	69	2,000	200	106,750	1,192
Tuna or "horse mackerel"	124,044	7,584	2,000	140	65,454	4,300	100,925	8,155	8,800	380	301,223	20,559
White perch					8,525	1,181	2,376	119	100	5	11,001	1,305
Whiting	6,200	62			6,930,399	64,529	1,004,950	14,713	129,100	2,322	8,070,649	81,626
Wolffish	76,096	841	3,899	40	2,060,067	42,011			36,885	664	2,176,949	43,556
Yellow perch	38	4			9,590	1,655	2,800	302	700	25	13,128	1,986
Total	100,560,305	1,454,083	631,929	16,725	342,300,784	10,811,520	14,438,070	511,678	38,157,357	1,023,150	496,088,445	13,817,156
SHELLFISH, ETC.												
Crabs:												
Hard	553,012	18,300			209,156	28,750	154,667	7,490	17,167	1,671	934,002	56,211
Soft									2,240	792	2,240	792
Lobsters	7,166,310	1,633,684	143,289	50,151	2,245,753	627,198	1,259,173	269,231	497,494	138,168	11,312,019	2,718,432
Shrimp					1,000	925					1,000	925
Squid	50,789	469			1,256,121	25,609	1,496,700	29,338	7,508	119	2,811,118	55,535
Clams:												
Cockle					38,862	6,939	97,218	6,066			136,080	13,005
Hard, public [1]	198,000	18,000			2,630,081	345,761	1,451,091	229,324	118,750	37,788	4,397,922	630,883
Hard, private [1]					297,825	44,975	114,224	22,568	1,100	350	413,149	67,893
Razor					468,992	21,382					468,992	21,382
Soft, public [2]	7,022,138	238,642			3,669,442	362,762	19,748	3,205	57,200	6,986	10,768,528	611,595
Surf or skimmer					69,700	5,150					69,700	5,150
Mussels, sea	90,000	2,250			26,851	4,914					116,851	7,164

[1] Statistics on hard clams used in this table are based on yields of 11 pounds of meats per bushel in Maine, Massachusetts, and Rhode Island and 8 pounds in Connecticut.
[2] Statistics on soft clams used in this table are based on yields of 15 pounds of meats per bushel in Maine, Massachusetts, and Rhode Island and 20 pounds in Connecticut.

Fisheries of the New England States, 1931—Continued

CATCH: BY STATES—Continued

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
SHELLFISH, ETC.—contd.	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Oysters:												
Market, public, spring [3]					1,312	$400			23,885	$2,755	25,197	$3,155
Market, public, fall [3]							1,350	$200	26,783	3,121	28,133	3,321
Market, private, spring [3]					132,899	60,102	1,076,624	232,967	555,560	60,634	1,765,083	353,703
Market, private, fall [3]					134,556	59,086	1,337,291	306,495	776,103	94,727	2,247,950	460,308
Seed, public, spring [4]							2,322	172	337,531	36,717	339,853	36,889
Seed, public, fall [4]							40,420	3,593	674,975	61,849	715,395	65,442
Seed, private, spring [4]					52,500	2,400			3,650,156	420,767	3,702,656	423,167
Seed, private, fall [4]									860,046	126,154	860,046	126,154
Periwinkles	8,000	$560			17,100	2,400	86,400	5,250	6,120	170	117,620	8,380
Scallops:												
Bay					1,589,791	392,851	107,708	35,271			1,697,499	428,122
Sea	586,870	77,366			493,663	57,435			423	49	1,080,956	134,850
Irish moss					89,250	4,969					89,250	4,969
Bloodworms					55,321	49,790			51	225	55,372	50,015
Sandworms					52,864	35,690					52,864	35,690
Total	15,675,119	$1,989,271	143,289	$50,151	13,533,039	2,139,488	7,244,936	1,151,170	7,613,092	933,052	44,209,475	6,323,132
Grand total	116,235,424	3,433,354	775,218	66,876	355,833,823	12,951,008	21,683,006	1,662,848	45,770,449	2,016,202	540,297,920	20,140,288

[3] Statistics on market oysters used in this table are based on yields of 6.56 pounds of meats per bushel in Massachusetts, 6.75 pounds in Rhode Island, and 7.35 pounds in Connecticut.

[4] Statistics on seed oysters used in this table are based on yields of 6.56 pounds of meats per bushel in Massachusetts, 6.75 pounds in Rhode Island, and 6.26 pounds in Connecticut.

NOTE.—Of the total catch in Maine, 11,676 pounds of fishery products, valued at $486, were taken in the southern winter trawl fishery off Maryland, Virginia, and North Carolina. Of the total catch in Massachusetts, 3,754,698 pounds of fishery products, valued at $108,555, were taken in the same fishery, while of the total catch in Connecticut, 154,023 pounds of fishery products, valued at $5,026, were taken in the same fishery. These products consisted principally of scup or porgy, sea bass, flounders, croaker, and gray squeteague.

PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	Maine		Massachusetts		Rhode Island		Connecticut		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:										
Hard.....number	1,659,036	$18,300	627,468	$28,750	464,001	$7,490	51,501	$1,671	2,802,006	$56,211
Soft.....do							6,720	792	6,720	792
Clams:										
Cockle.....bushels			2,159	6,939	5,401	6,066			7,560	13,005
Hard, public.....do	18,000	18,000	239,098	345,761	131,917	229,324	14,844	37,798	403,859	630,883
Hard, private.....do			27,075	44,975	10,384	22,568	138	350	37,597	67,893
Razor.....do			14,656	21,382					14,656	21,382
Soft, public.....do	468,143	238,612	244,629	362,762	1,317	3,205	2,860	6,986	716,949	611,595
Surf or skimmer.do			4,647	5,150					4,647	5,150
Mussels.....do	9,000	2,250	4,215	4,914					13,215	7,164
Oysters:										
Market, public, spring bushels			200	400			3,250	2,755	3,450	3,155
Market, public, fall bushels					200	200	3,644	3,121	3,844	3,321
Market, private, spring.....bushels			20,259	60,102	159,500	232,967	75,586	60,634	255,345	353,703
Market, private, fall bushels			20,512	59,086	198,117	306,495	105,592	94,727	324,221	460,308
Seed, public, spring bushels					344	172	53,919	36,717	54,263	36,889
Seed, public, fall bushels					5,988	3,593	107,823	61,849	113,811	65,442
Seed, private, spring bushels			8,003	2,400			583,092	420,767	591,095	423,167
Seed, private, fall bushels							137,388	126,154	137,388	126,154
Periwinkles.....do	444	560	950	2,400	4,800	5,250	340	170	6,534	8,380
Scallops:										
Bay.....do			256,832	392,851	17,428	35,271			274,260	428,122
Sea.....do	65,208	77,366	73,135	57,435			71	49	138,414	134,850

Industries related to the fisheries of the New England States, 1931

OPERATING UNITS, SALARIES, AND WAGES

Item	Maine and New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	179	66	29	33	307
On boats	8			8	16
Total	187	66	29	41	323
Vessels:					
Steam	1				1
Net tonnage	26				26
Motor	87	16	9	5	117
Net tonnage	944	562	117	234	1,857
Total vessels	88	16	9	5	118
Total net tonnage	970	562	117	234	1,883
Boats	4			4	8
Wholesale and manufacturing:					
Establishments	157	204	40	35	436
Persons engaged:					
Proprietors	165	82	26	29	302
Salaried employees	153	697	48	68	966
Wage earners:					
Average for season	5,254	2,610	390	751	9,005
Average for year	1,349	2,148	270	540	4,307
Paid to salaried employees	$378,316	$1,794,357	$110,346	$222,158	$2,505,177
Paid to wage earners	988,080	2,787,368	274,057	558,781	4,608,286
Total salaries and wages	1,366,396	4,581,725	384,403	780,939	7,113,463
Fishermen manufacturing	239	2,410	339	24	3,012

Industries related to the fisheries of the New England States, 1931—Continued

PRODUCTS MANUFACTURED

Item		Maine and New Hampshire		Massachusetts		Rhode Island		Connecticut	
		Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:									
Alewives:									
Salted	pounds	1,168,733	$26,525						
Smoked	do	(1)	(1)	88,148	$2,573				
Cod:									
Fresh sticks	do	219,130	41,384						
Fresh fillets	do	144,696	14,719	3,876,701	458,051			(1)	(1)
Frozen fillets	do	(1)	(1)	1,154,832	123,205			(1)	(1)
Salted:									
Green	do	1,658,415	83,540						
Dry	do			885,418	52,908				
Boneless	do	(1)	(1)	9,763,995	700,826				
Smoked fillets	do	(1)	(1)	638,352	95,547				
Oil, cod and cod-liver	gallons	13,559	5,339	54,095	38,208			(1)	(1)
Cusk:									
Fresh sticks	pounds	189,250	32,725						
Fresh fillets	do	15,275	1,462	429,029	56,082				
Frozen fillets	do	(1)	(1)	9,125	933				
Salted:									
Green	do	27,177	848						
Dry	do			(1)	(1)				
Boneless	do			111,440	3,539				
Smoked fillets	do			853,612	134,354				
Flounders, fresh fillets	do	(1)	(1)	884,929	182,775			(1)	(1)
Haddock:									
Fresh pandressed	do			159,849	20,897				
Fresh sticks	do	77,800	14,920						
Fresh fillets	do	160,314	22,741	25,556,764	3,886,925			(1)	(1)
Frozen fillets	do	87,675	10,917	7,543,568	944,542			(1)	(1)
Salted:									
Green	do	55,438	2,403						
Dry	do			(1)	(1)				
Boneless	do			383,450	26,421				
Smoked fillets	do	125,650	25,229	263,541	45,216				
Finnan haddie	do	54,000	5,600	1,977,779	201,285	(1)	(1)	(1)	(1)
Hake:									
Fresh sticks	do	219,500	31,115						
Fresh fillets	do	70,860	6,722	1,834,198	211,427			(1)	(1)
Frozen fillets	do	(1)	(1)	129,859	11,913			(1)	(1)

Salted:									
Green	do	355,782	9,348						
Dry	do			(1)	(1)				
Boneless	do			488,530	15,786				
Halibut, smoked	do			36,860	8,691				
Herring, sea:									
Smoked:									
Boneless	do	1,480,569	124,964						
Bloaters	do	1,174,388	26,302	927,229	86,980				
Lengthwise	do	98,108	5,318						
Medium-scaled	do	205,015	11,570						
Kippered	do			162,979	28,442				
Canned, "sardines"	standard cases	885,408	2,647,187						
Meal	tons	1,587	37,257						
Oil	gallons	89,403	12,089						
Scales	pounds	184,696	5,588						
Mackerel:									
Fresh fillets	do			39,049	7,726				
Salted:									
Fillets	do			1,058,300	133,697				
Split	do	131,756	7,159	1,102,070	91,255				
Smoked	do			73,786	14,436				
Pollock:									
Fresh fillets	do			304,518	26,985			(1)	(1)
Frozen fillets	do			60,455	4,836			(1)	(1)
Salted:									
Green	do	160,061	5,955						
Dry	do			222,100	4,779				
Boneless	do			226,740	6,998				
Salmon, smoked	do			181,005	67,230			(1)	(1)
Shad, smoked	do			14,197	2,960				
Whitefish, smoked	do			184,903	60,668			(1)	(1)
Wolffish, fresh fillets	do			40,500	5,158			(1)	(1)
Crabmeat, packaged, fresh-cooked	do	(1)	(1)	157,489	86,222				
Lobster meat, packaged, fresh-cooked	do			124,052	136,542				
Clams:									
Hard, fresh-shucked	gallons			(1)	(1)	7,650	$16,800	(1)	(1)
Soft:									
Fresh-shucked	do			78,475	111,350	14,370	16,463		
Canned:									
Whole	standard cases	96,187	337,464	(1)	(1)				
Chowder	do	43,570	103,078	(1)	(1)				
Juice and boullion	do	14,100	33,569						
Marine-shell products:									
Buttons	gross	(1)	(1)	(1)	(1)			1,140,835	$838,257
Novelties		(1)	(1)	(1)	(1)		18,067	(1)	(1)
Oysters, fresh-shucked	gallons			2,185	6,323	307,233	715,542	201,400	404,470

[1] This item has been included under unclassified products.

Industries related to the fisheries of the New England States, 1931—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine and New Hampshire		Massachusetts		Rhode Island		Connecticut	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments—Continued								
Unclassified products:								
Pandressed, fresh and frozen ..... pounds			[2] 555, 554	[2] $89, 045				
Fillets, fresh and frozen ..... do	[3] 10, 735	[3] $1, 290	[4] 132, 147	[4] 28, 194			(5)	(5)
Salted ..... do			[6] 778, 785	[6] 18, 795				
Smoked ..... do	[7] 195, 600	[7] 5, 240	[8] 50, 076	[8] 10, 893	(5)	(5)	(5)	(5)
Canned:								
Fish cakes, balls, etc ..... standard cases	7, 950	49, 430	93, 596	715, 876				
Fish flakes ..... do	(1)	(1)	11, 882	108, 623				
Other ..... do	[9] 16, 911	[9] 409, 593	[10] 21, 057	[10] 83, 128	(5)	(5)		
Fish meal ..... tons	534	29, 200	9, 068	541, 208			(1)	(1)
Glue ..... gallons			398, 325	939, 725				
Miscellaneous		[11] 190, 974		[12] 106, 716		[13] $244, 731		[14] $1, 236, 963
Total		4, 378, 764		10, 746, 894		1, 011, 603		2, 479, 690
By fishermen:								
Alewives:								
Salted ..... pounds			82, 500	4, 950				
Pickled ..... do			460, 000	12, 075				
Smoked ..... do	252, 116	11, 808	10, 000	500				
Cod, salted, green ..... do	30, 733	1, 229	831, 804	29, 541				
Cusk, salted, green ..... do	755	20	4, 425	86				
Flounders, fresh fillets ..... do							2, 600	1, 029
Haddock, salted, green ..... do			675	10				
Hake, salted, green ..... do	1, 865	37	3, 880	. 54				
Herring, sea, salted ..... do	6, 555	256						
Mackerel, salted, split ..... do	800	32	57, 685	2, 415				
Pollock, salted, green ..... do			430	11				
Crab meat ..... do	19, 814	10, 000	4, 500	2, 025				
Clams:								
Razor, fresh-shucked ..... gallons			47, 046	19, 132				
Soft:								
Fresh-shucked ..... do	21, 004	15, 352	114, 755	132, 450			1, 326	1, 658
Steamed ..... do	11, 118	11, 777						
Surf or skimmer, fresh-shucked ..... do			1, 000	2, 000				
Oysters, fresh-shucked ..... do							2, 434	4, 953

Scallops:								
Bay, fresh-shucked	do			171,379	393,342	11,968	35,271	
Sea, fresh-shucked	do	62,364	73,100	63,667	65,748			47	54
Total			123,611		664,339		35,271		7,694
Grand total			4,502,375		11,411,233		1,046,874		2,487,384

[2] Includes fresh pandressed cod, flounders, halibut, salmon, and wolffish; and frozen pandressed cod, haddock, halibut, salmon, and wolffish.
[3] Includes fresh fillets of flounders and frozen fillets of cod, cusk, flounders, and hake.
[4] Includes fresh fillets of salmon, frozen fillets of flounders and mackerel, and steaks of halibut and salmon.
[5] This item has been included under miscellaneous.
[6] Includes salted sea herring; dry-salted cusk, haddock, and hake; and pickled sea herring.
[7] Includes smoked alewives, cod, cod fillets, cusk fillets, and hake fillets.
[8] Includes smoked butterfish, carp, cod, cusk, flounders, hake, hake fillets, lake trout, spiced salmon, and sturgeon.
[9] Includes canned finnan haddie, fish flakes, and haddock fillets.
[10] Includes finnan haddie; haddock chowder; mackerel; fish hash; fish eggs for food; soft clams, whole and chowder; dog food; and rat bait.
[11] Includes salted herring and boneless cod, crab meat, steamed soft clams, dry scrap, clam meal, tanners' oil and marine and fresh-water mussel shell products.
[12] Includes shucked hard clams, green and dry scrap, fish oil, mussel-shell buttons, and marine-shell buttons and novelties.
[13] Includes finnan haddie, canned hard-clam chowder, and oyster-shell products.
[14] Includes fresh fillets of cod, flounders, haddock, hake, pollock, and wolffish; frozen fillets of cod, flounders, haddock, hake, halibut, pollock, and salmon; packaged frozen smelts; smoked butterfish, carp, haddock fillets, salmon, sturgeon, and whitefish; packaged frozen shrimp and scallops; fresh-shucked hard clams; fish meal; cod-liver oil; and marine-shell novelties.

NOTE.—The total value of products for the New England States was as follows: By manufacturing establishments, $18,616,951; and by fishermen, $830,915. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 2,254 have also been included as fishermen and 4 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

MAINE

Fisheries of Maine, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines		Pound nets
	Mackerel	Other		Anchor	Drift	Hand	Trawl	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	23	186	2	52		23	204	
On boats and shore:								
Regular	6	90	108	153		299	687	
Casual			2	80	5	867		1
Total	29	276	112	285	5	1,189	891	1
Vessels:								
Motor	4	33	1	10		6	23	
Net tonnage	34	371	9	93		55	431	
Boats:								
Motor	2	29	55	73		275	502	
Other	2	29	54	60	4	6	9	1
Apparatus:								
Number	6	62	56	1,505	4	4,630	29,932	1
Length, yards	1,880	14,050	5,920					
Square yards				446,172	1,200			
Hooks, baits, or snoods						4,833	1,496,890	

Item	Floating traps	Weirs	Fyke nets	Dip nets	Bag nets	Pocket nets	Otter trawls	Box traps
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							45	
On boats and shore:								
Regular	28	165		8	40		42	
Casual	6	55	13	80	63	4		5
Total	34	220	13	88	103	4	87	5
Vessels:								
Motor							11	
Net tonnage							90	
Boats:								
Motor	17	50	2			1	23	
Other	3	128	11		23	3		
Apparatus:								
Number	24	160	71	88	201	4	33	5
Yards at mouth							856	

Item	Pots			Harpoons	Spears	Dredges, scallop	Hoes	By hand	Total, exclusive of duplication
	Crab	Eel	Lobster						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			4	171		20			454
On boats and shore:									
Regular	32	14	2,384	90	6	73	1,482	28	3,862
Casual		12	4		25				1,082
Total	32	26	2,392	261	31	93	1,482	28	5,398
Vessels:									
Motor			2	16		6			78
Net tonnage			10	366		54			937
Boats:									
Motor	17		2,033	45		67	167		2,418
Other	15	26	331		31		801		1,292
Accessory boats									190
Apparatus:									
Number	1,049	402	220,140	61	31	77	1,472		
Yards at mouth						136			

Fisheries of Maine, 1931—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Other				Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			36,280	$615			63,000	$885	6,000	$120
Bluefish			540	16						
Butterfish			15,163	1,070			118	8		
Cod			410	9			4,498,838	131,167		
Cusk							16,386	284		
Flounders							51,069	1,453		
Haddock							1,360,733	31,103		
Hake							376,076	4,837		
Halibut							107	16		
Herring, sea	264,600	$2,646	24,137,837	140,432	258,370	$1,848	13,060	158		
Mackerel	478,569	11,069	3,062,429	87,032	5,000	200	561,085	17,432		
Pollock			51,740	568			859,616	6,806		
Salmon			6	1			17,106	4,603		
Shad	22,235	335	125,936	2,706			3,199	100	1,602	320
Sharks			8,657	105			59,362	910		
Smelt					144,833	18,558	50,086	10,034		
Sturgeon			45	7			833	124		
Tomcod					3,050	56				
Wolffish							1,127	10		
Lobsters							177	46		
Total	765,404	14,050	27,439,043	232,561	411,253	20,660	7,931,979	209,976	7,602	440

Species	Lines				Pound nets		Floating traps		Weirs	
	Hand		Trawl							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives									1,005,984	$7,849
Butterfish							88,843	$6,463		
Catfish and bullheads			26,344	$276						
Cod	2,156,057	$32,798	5,551,151	122,386						
Cusk	6,168	65	1,331,587	22,419						
Eels			12,860	1,157						
Flounders	120	1	20,778	550						
Haddock	730,197	17,711	8,508,290	277,559						
Hake	647,264	6,020	4,229,077	47,210						
Halibut	11,740	1,701	81,460	11,217						
Herring, sea							233,988	2,138	30,871,015	108,583
Mackerel							1,173,554	30,525	141,200	2,470
Pollock	418,758	3,384	549,394	4,435						
Rosefish			1,103	13						
Salmon							10,434	2,396	40,644	11,224
Shad							4,791	131		
Sharks	2,576	29	3,330	41						
Smelt	232,253	37,959			200	$40	2,100	415	8,210	1,620
Whiting							6,200	62		
Wolffish	89	1	73,323	816						
Squid							50,600	466		
Total	4,205,222	99,669	20,388,697	488,079	200	40	1,570,510	42,596	32,067,053	131,746

Fisheries of Maine, 1931—Continued

CATCH: BY GEAR—Continued

Species	Fyke nets		Dip nets		Bag nets		Pocket nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			1,684,631	$8,408						
Butterfish									34	$1
Cod									446,014	11,636
Croaker									612	15
Cusk									33,530	605
Eels	2,920	$280								
Flounders									1,256,052	38,384
Haddock									1,095,001	33,692
Hake									391,170	4,942
Halibut									397	61
Herring, sea			6,000	60						
King whiting or "king-fish"									515	20
Rosefish									8,652	88
Salmon			2,000	600						
Smelt			17,840	2,351	110,300	$19,370	1,600	$240		
Squeteagues or "sea trout", gray									45	2
Sturgeon									183	45
Suckers	53,675	3,875								
Tomcod	1,600	48			64,000	500				
Wolffish									1,557	14
Yellow perch	38	4								
Squid									189	3
Total	58,233	4,207	1,710,471	11,419	174,300	19,870	1,600	240	3,233,951	89,508

Species	Box traps		Pots						Harpoons	
			Crab		Eel		Lobster			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	15,300	$1,436			123,691	$6,446				
Swordfish									343,038	$70,812
Tuna or "horse mackerel"									124,044	7,584
Crabs, hard			368,746	$11,721			184,266	$6,579		
Lobsters			22,152	5,909			7,143,981	1,627,729		
Total	15,300	1,436	390,898	17,630	123,691	6,446	7,328,247	1,634,308	467,082	78,396

Species	Spears		Dredges, scallop		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	39,680	$3,259						
Clams:								
Hard, public					198,000	$18,000		
Soft, public					7,022,138	238,642		
Mussels							90,000	$2,250
Periwinkles							8,000	560
Scallops, sea			586,870	$77,366				
Total	39,680	3,259	586,870	77,366	7,220,138	256,642	98,000	2,810

Fisheries of Maine, 1931—Continued

OPERATING UNITS: By counties

Item	Cumberland	Hancock	Kennebec	Knox	Lincoln	Penobscot	Sagadahoc	Waldo	Washington	York
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	288	18		78	54				12	4
On boats and shore:										
Regular	664	830		619	401		166	40	865	277
Casual	15	377	3	90	274	15	196	49	57	6
Total	967	1,225	3	787	729	15	362	89	934	287
Vessels:										
Motor	38	6		20	10				3	1
Net tonnage	602	38		164	82				43	8
Boats:										
Motor	380	521	1	475	274	2	85	12	475	193
Other	224	273	2	131	127	13	95	49	292	86
Accessory boats	156	1		17	10				3	3
Apparatus:										
Purse seines:										
Mackerel				3	3					
Length, yards				1,150	730					
Other	21	2		10	20		1		7	1
Length, yards	5,570	250		1,370	4,650		160		1,750	300
Haul seines	27	9		14	3					3
Length, yards	2,880	900		1,540	300					300
Gill nets:										
Anchor	426	193		103	170	80	2	24	198	309
Square yards	212,040	39,900		28,292	85,200	5,343	360	1,653	23,604	49,780
Drift					4					
Square yards					1,200					
Lines:										
Hand	96	2,031		335	1,179		886		100	3
Hooks	121	2,134		370	1,195		892		115	6
Trawl	10,980	5,238		4,740	1,360		1,440	60	3,814	2,300
Hooks	549,000	261,975		237,000	68,000		72,000	3,000	189,915	116,000
Pound nets									1	
Floating traps	8				3		8	3	2	
Weirs		62		14	2		4	19	59	
Fyke nets			26		12		33			
Dip nets		7		12	15		3	15	22	14
Bag nets		38				2	2	54	105	
Pocket nets							4			
Otter trawls	10	20		2	1					
Yards at mouth	268	505		50	33					
Box traps				3	1				1	
Pots:										
Crab	759			25	265					
Eel	75			28	40	30	89			140
Lobster	26,471	51,091		53,636	24,782		4,948	260	45,518	13,434
Harpoons	43				4		6			8
Spears		2		12	4		9			4
Dredges, scallop	12	48		17						
Yards at mouth	16	80		40						
Hoes	322	306		102	153		95	28	377	89

Fisheries of Maine, 1931—Continued

CATCH: BY COUNTIES

Species	Cumberland		Hancock		Kennebec	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	16,980	$253	948,083	$7,093		
Bluefish	540	16				
Butterfish	42,076	3,164				
Catfish and bullheads	20,382	215				
Cod	4,687,776	145,671	2,599,965	40,946		
Croaker	612	15				
Cusk	1,005,220	17,805	23,907	211		
Eels	12,846	1,156	8,800	440	2,860	$275
Flounders	387,391	11,879	695,010	19,656		
Haddock	4,350,038	154,686	2,189,177	55,862		
Hake	2,937,606	39,402	583,107	3,784		
Halibut	32,011	4,080	16,787	2,511		
Herring, sea	6,537,147	44,605	4,711,320	20,942		
King whiting or "kingfish"	515	20				
Mackerel	1,704,797	51,877	12,500	500		
Pollock	1,088,469	9,053	141,685	1,240		
Rosefish	9,630	99				
Salmon	998	204	24,044	6,483		
Shad	73,342	1,886				
Sharks	63,580	936				
Smelt	96,253	11,123	109,449	20,418		
Squeteagues or "sea trout," gray	45	2				
Sturgeon	850	147				
Suckers					30,775	2,463
Swordfish	343,038	70,812				
Tomcod	3,050	56				
Tuna or "horse mackerel"	78,359	4,707				
Whiting	6,200	62				
Wolffish	49,829	528				
Crabs, hard	419,615	14,298				
Lobsters	1,032,870	252,764	1,669,995	365,385		
Squid	26,789	269				
Clams:						
Hard, public	198,000	18,000				
Soft, public	1,124,145	52,567	1,143,000	31,791		
Mussels	90,000	2,250				
Scallops, sea	15,300	3,400	149,110	26,842		
Total	26,456,299	918,007	15,025,939	604,104	33,635	2,738

Species	Knox		Lincoln		Penobscot	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	456,298	$2,871	675,833	$4,593		
Butterfish			31,000	2,300		
Cod	2,031,482	38,583	1,271,426	23,994		
Cusk	101,828	1,127	44,668	630		
Eels	29,280	2,641	22,400	2,040	43,400	$884
Flounders	214,425	7,797	19,332	733		
Haddock	2,363,151	71,126	721,245	16,050		
Hake	707,165	5,358	311,825	2,713		
Halibut	15,844	2,205	3,914	562		
Herring, sea	14,961,060	69,571	6,231,970	50,446		
Mackerel	413,943	8,841	2,319,555	61,045		
Pollock	168,142	1,103	108,358	1,048		
Salmon			3,500	700	10,403	2,870
Shad	10,705	176	69,102	1,398		
Sharks	2,845	31				
Smelt	61,540	8,106	67,434	10,715	7,500	1,200
Sturgeon			131	17		
Suckers			6,000	360		
Tuna or "horse mackerel"			14,720	883		
Wolffish	75	1	588	6		
Crabs, hard	11,227	337	122,170	3,665		
Lobsters	1,775,370	398,881	848,915	196,062		
Squid			24,000	200		
Clams: Soft, public	573,778	18,316	625,590	19,515		
Scallops, sea	422,460	47,124				
Total	24,320,618	684,195	13,543,676	399,675	61,303	4,954

Fisheries of Maine, 1931—Continued

CATCH: By counties—Continued

Species	Sagadahoc		Waldo		Washington		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	64,000	$740			634,701	$2,327		
Butterfish	30,964	2,070					118	$8
Catfish and bullheads	5,962	61						
Cod	360,687	10,824	39,740	$1,387	919,534	14,538	741,860	22,053
Cusk	62,931	1,155			33,758	183	115,359	2,262
Eels	34,460	1,431			2,500	300	37,905	3,411
Flounders	2,376	66			1,900	39	7,585	218
Haddock	387,610	14,839	8,610	512	895,573	17,851	778,817	29,139
Hake	370,301	4,296	500	10	293,601	2,339	439,482	5,107
Halibut	2,670	326			18,447	2,751	4,031	560
Herring, sea	796,790	4,684	560,000	2,400	21,919,783	62,551	66,800	664
Mackerel	425,281	11,641	7,000	200	121,700	1,770	417,062	12,854
Pollock	15,881	174			322,692	2,218	34,281	357
Rosefish	125	2						
Salmon	1,160	234	23,565	6,629	6,500	1,700	20	4
Shad	2,394	65					2,220	67
Sharks							7,500	118
Smelt	57,750	8,664	93,776	15,957	64,120	13,124	9,600	1,280
Sturgeon							80	12
Suckers	16,900	1,052						
Tomcod	1,600	48	8,000	100	56,000	400		
Tuna or "horse mackerel"	17,465	1,049					13,500	945
Wolffish	11,377	117					14,227	189
Yellow perch	38	4						
Lobsters	222,976	53,909	9,204	2,557	1,090,831	240,000	516,149	124,126
Clams: Soft, public	821,950	32,718	32,640	2,098	2,453,985	68,855	247,050	12,782
Periwinkles					8,000	560		
Total	3,713,648	150,169	783,035	31,850	28,843,625	431,506	3,453,646	216,156

NEW HAMPSHIRE

Fisheries of New Hampshire, 1931 [1]

OPERATING UNITS: By gear

Item	Haul seines	Lines		Pots, lobster	Harpoons	Total, exclusive of duplication
		Hand	Trawl			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore:						
Regular	3		17	52	4	60
Casual		36				36
Total	3	36	17	52	4	96
Boats:						
Motor	1		14	52	2	57
Other	1					1
Apparatus:						
Number	1	144	620	3,825	2	
Length, yards	100					
Hooks		144	31,000			

CATCH: By gear

Species	Haul seines		Lines				Pots, lobster		Harpoons	
			Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod			36,400	$732	23,600	$808				
Cusk			3,500	35	13,360	134				
Flounders			7,280	218	200	4				
Haddock			145,600	5,824	95,130	3,805				
Hake			159,160	2,387	93,700	937				
Herring, sea	8,000	$120								
Pollock			32,760	328	1,340	13				
Smelt			6,000	1,200					2,000	$140
Tuna or "horse mackerel"										
Wolffish			3,469	36	430	4				
Lobsters							143,289	$50,151		
Total	8,000	120	394,169	10,760	227,760	5,705	143,289	50,151	2,000	140

[1] The fisheries of New Hampshire are confined to Rockingham County.

MASSACHUSETTS

Fisheries of Massachusetts, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines		Pound nets	Floating traps	Weirs
	Mackerel	Other		Anchor	Drift	Hand	Trawl			
Fishermen:	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
On vessels	1,067			204	670	207	1,218			
On boats and shore:										
Regular	57	2	45	26	183	205	577	184	36	8
Casual			18	2		14	5			
Total	1,124	2	63	232	853	426	1,800	184	36	8
Vessels:										
Motor	94			23	73	19	71			
Net tonnage	3,106			416	1,709	557	3,686			
Sail						1				
Net tonnage						6				
Total vessels	94			23	73	20	71			
Total net tonnage	3,106			416	1,709	563	3,686			
Boats:										
Motor	12	1	9	16	87	122	212	58	14	2
Other	12	1	24	9	83	47	60	95	22	4
Accessory boats	78			7	98	14	556			
Apparatus:										
Number	106	1	19	1,373	9,316	533	47,936	132	20	6
Length, yards	50,318	150	3,055							
Square yards				487,803	3,097,864					
Hooks, baits, or snoods						759	2,383,422			

Item	Fyke nets	Dip nets	Push nets	Otter trawls	Box traps	Pots				Harpoons
						Crab	Eel	Lobster	Periwinkle and cockle	
Fishermen:	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
On vessels				2,430				9		948
On boats and shore:										
Regular	19	149	34	161	3	22	53	604	21	112
Casual	11	30	122				11	346		
Total	30	179	156	2,591	3	22	64	959	21	1,060
Vessels:										
Steam				21						
Net tonnage				3,133						
Motor				232				5		86
Net tonnage				9,491				30		3,160
Total vessels				253				5		86
Total net tonnage				12,624				30		3,160
Boats:										
Motor		25		69		22	39	728	12	44
Other	21	5	84				28	210	7	58
Accessory boats										193
Apparatus:										
Number	49	94	156	322	3	1,620	1,963	72,914	1,015	130
Yards at mouth				9,760						

Fisheries of Massachusetts, 1931—Continued

OPERATING UNITS: By gear—Continued

Item	Spears	Dredges			Tongs	Rakes	Forks	Hoes	By hand	Total, exclusive of duplication
		Clam	Oyster	Scallop						
Fishermen:	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
On vessels		37	11	66		4				4,403
On boats and shore:										
Regular	136	139	14	452	169	470	464	294	27	2,945
Casual	137			586	49	289	400	146	13	1,832
Total	273	176	25	1,104	218	763	864	440	40	9,180
Steam										21
Net tonnage										3,133
Motor		12	4	14		2				396
Net tonnage		103	45	176		11				15,224
Sail										1
Net tonnage										6
Total vessels		12	4	14		2				418
Total net tonnage		103	45	176		11				18,363
Boats:										
Motor		76	6	610	61	129	39	15		1,706
Other	134			2	173	601	212	174		1,619
Accessory boats		1								947
Apparatus:										
Number	273	88	20	3,228	218	762	864	440		
Yards at mouth		44	21	2,602						

CATCH: By gear

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Other				Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	266,570	$3,018			876,700	$9,498			820	$19
Bluefish	45	2			3,500	525	1,000	$300	19,330	2,508
Butterfish	30,507	2,496					4,785	287	3,806	373
Cod							2,922,052	112,817	6,242	206
Cunner							349,151	15,581		
Cusk							5,899	88	302	4
Eels					32,000	800				
Flounders							1,870	77		
Haddock							2,835,370	75,894	3,960	180
Hake							507,736	9,070	3,690	46
Herring, sea	234,100	2,483			4,500	45			4,500	90
Mackerel	32,263,244	1,357,165			16,000	715	4,575	264	3,665,722	159,857
Pollock							1,674,515	20,575	550	5
Sand launce			1,200	$24	240,000	2,450				
Shad	11,760	474			6,000	600	115,093	5,147	30	1
Sharks							12,010	113		
Striped bass					27,000	4,650				
White perch					7,000	910			1,500	270
Wolffish							176	2		
Yellow perch					8,840	1,623				
Total	32,806,226	1,365,638	1,200	24	1,221,540	21,816	8,434,232	240,215	3,710,452	163,559

Fisheries of Massachusetts, 1931—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets		Floating traps	
	Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					185,279	$1,648	17,850	$215
Bluefish	142,400	$13,667			10,392	957	323	80
Bonito					27,035	2,050		
Butterfish			703	$193	497,564	32,423	72,647	6,452
Catfish and bullheads			37,000	370				
Cod	1,633,126	43,808	32,367,017	819,980	91,204	2,490	18,204	477
Cusk	63,252	1,059	4,176,435	71,293				
Eels	13,600	988			7,550	396		
Flounders	24,730	1,255	733,610	35,528	32,005	1,399	25,750	1,038
Grayfish					42,830	431		
Haddock	409,370	14,551	33,920,771	1,164,515				
Hake	93,259	1,245	4,563,917	81,154				
Halibut	49,838	6,852	2,097,118	275,348				
Herring, sea					2,593,999	33,524	950,170	12,424
Mackerel	29,500	1,770			2,489,295	78,552	556,602	20,540
Pollock	107,592	1,516	1,388,467	19,148	9,790	140	9,542	92
Rosefish			26,100	423				
Salmon							38	8
Scup or porgy	521,000	21,348			97,332	4,405		
Sea bass	93,900	4,835			6,600	869		
Shad					10,500	631	100	5
Sharks	360	7	2,076	20	38,774	277		
Skates			13,700	162	2,100	22		
Smelt	4,100	895						
Squeteagues or "sea trout":								
Gray					400	32		
Spotted					2,737	281		
Striped bass	5,000	1,000			1,400	140		
Sturgeon			270	27				
Swordfish			691	170				
Tautog	159,100	7,059			25,261	1,279	315	10
Tomcod					31,900	319		
Tuna or "horse mackerel"					63,037	4,108	670	47
Whiting			79,300	1,563	4,613,530	40,396	1,433,950	13,033
Woffish	10,725	393	414,072	10,724				
Yellow perch			400	4	350	28		
Squid					1,083,195	21,847	71,100	1,936
Total	3,360,852	122,248	79,821,647	2,480,622	11,964,059	228,644	3,157,261	56,357

Species	Weirs		Fyke nets		Dip nets		Push nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					774,800	$7,254		
Bluefish	13,000	$1,690						
Bonito	3,700	283						
Butterfish	12,680	958						
Cod	15,042	410						
Eels			58,000	$4,160				
Grayfish	1,500	23						
Herring, sea	41,200	824			4,045,000	46,275		
Mackerel	124,575	4,047			286,000	6,540		
Minnows					1,250	375		
Striped bass	2,200	396			12,000	2,130		
Tautog	2,125	106						
Tuna or "horse mackerel"	1,500	120						
Whiting	701,960	7,020						
Shrimp					1,000	925		
Squid	81,195	1,399						
Scallops, bay							121,950	$31,125
Total	1,000,677	17,276	58,000	4,160	5,120,050	63,499	121,950	31,125

Fisheries of Massachusetts, 1931—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls		Box traps		Pots			
					Crab		Eel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			90,000	$450				
Bluefish	1,049	$81						
Butterfish	110,321	8,116						
Carp	855	43						
Cod	36,225,036	935,102						
Croaker	498,493	15,480						
Cunner	600	14						
Cusk	821,012	15,959						
Drum:								
Black	880	10						
Red	433	7						
Eels	10,094	130					189,500	$12,591
Flounders	24,902,106	1,002,357						
Goosefish	150	2						
Haddock	113,261,700	3,301,472						
Hake	4,992,548	100,056						
Halibut	629,930	89,025						
Herring, sea	5,700	142						
Hogfish	10,749	216						
Kingfish or "king mackerel"	199	5						
King whiting or "kingfish"	3,074	101						
Mackerel	22,963	952						
Mullet	223	13						
Pollock	4,729,989	71,842						
Rosefish	197,312	2,466						
Scup or porgy	1,334,535	32,709						
Sea bass	670,649	16,649						
Sea robin	150	4						
Shad	6,995	278						
Sharks	6,588	91						
Skates	37,290	284						
Smelt	680	34						
Spot	40	1						
Squeteagues or "sea trout", gray	149,567	6,310						
Sturgeon	5,124	691						
Swordfish	254	55						
Tuna or "horse mackerel"	247	25						
White perch	25	1						
Whiting	101,659	2,517						
Wolffish	1,635,094	30,892						
Crabs, hard					168,560	$21,699		
Lobsters	4	1						
Squid	20,631	427						
Scallops, sea	1,060	112						
Total	190,396,008	5,634,672	90,000	450	168,560	21,699	189,500	12,591

Species	Pots—Continued				Harpoons		Spears	
	Lobster		Periwinkle and cockle					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels							67,450	$4,704
Sharks					2,940	$51		
Swordfish					2,156,875	421,641		
Crabs, hard	40,596	$7,051						
Lobsters	2,245,749	627,197						
Clams: Cockle			38,862	$6,939				
Periwinkles			14,400	1,950				
Total	2,286,345	634,248	53,262	8,889	2,159,815	421,692	67,450	4,704

Fisheries of Massachusetts, 1931—Continued

CATCH: BY GEAR—Continued

Species	Dredges						Tongs	
	Clam		Oyster		Scallop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	1,013,088	$122,354					362,274	$49,651
Hard, private							66,825	15,225
Mussels	26,851	4,914						
Oysters:								
Market, public, spring							1,312	400
Market, private, spring			64,654	$28,747			68,245	31,355
Market, private, fall			48,112	20,296			86,444	38,790
Seed, private, spring							52,500	2,400
Scallops:								
Bay					1,451,641	$357,586		
Sea					492,603	57,323		
Total	1,039,939	127,268	112,766	49,043	1,944,244	414,909	637,600	137,821

Species	Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	1,205,572	$169,348	49,147	$4,408				
Hard, private	231,000	29,750						
Razor			32,000	1,500	436,992	$19,882		
Soft			2,731,550	269,362	937,892	93,400		
Surf or skimmers			35,700	3,150			34,000	$2,000
Periwinkles							2,700	450
Scallops, bay							16,200	4,140
Irish moss	89,250	4,969						
Bloodworms			55,321	49,790				
Sandworms			52,864	35,690				
Total	1,525,822	204,067	2,956,582	363,900	1,374,884	113,282	52,900	6,590

OPERATING UNITS: BY COUNTIES

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	141	196	35	1,968	102		3	1,958
On boats and shore:								
Regular	854	295	184	651	72	69	253	567
Casual	496	131	117	381	104	118	371	114
Total	1,491	622	336	3,000	278	187	627	2,639
Vessels:								
Steam				1				20
Net tonnage				184				2,949
Motor	27	28	7	155	26		1	152
Net tonnage	350	709	96	6,765	289		10	7,005
Sail	1							
Net tonnage	6							
Total vessels	28	28	7	156	26		1	172
Total net tonnage	356	709	96	6,949	289		10	9,954
Boats:								
Motor	463	225	166	303	89	35	270	155
Other	563	185	137	388	59	30	207	50
Accessory boats	30	9	16	593	4			295
Apparatus:								
Purse seines:								
Mackerel	3	5		68				30
Length, yards	1,400	638		33,280				15,000
Other	1							
Length, yards	150							
Haul seines	7	1	4	5			2	
Length, yards	1,535	120	990	360			50	

Fisheries of Massachusetts, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Apparatus—Continued								
Gill nets:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Anchor	14			1,305				54
Square yards	6,560			480,203				1,040
Drift	1,494	230	265	5,002	16	7	27	2,275
Square yards	434,860	66,000	85,860	1,742,140	5,184	1,680	9,240	752,900
Lines:								
Hand	68	176	24	175		15	13	62
Hooks	80	348	24	214		15	13	65
Trawl	3,864		240	22,896	60		480	20,396
Hooks	193,200		7,800	1,154,124	2,100		17,280	1,008,918
Pound nets	91	18	14		4		5	
Floating traps	7			13				
Weirs	6							
Fyke nets	36	7	6					
Dip nets	16			49		2	12	15
Push nets	140				16			
Otter trawls	48	30	19	72	25			128
Yards at mouth	1,445	1,005	495	2,225	710			3,880
Box traps							3	
Pots:								
Crab						60	35	1,525
Eel	790	170	418	50	520		15	
Lobster	9,420	16,203	8,826	18,996	1,383	2,639	12,991	2,456
Periwinkle and cockle	705			150			160	
Harpoons	16	25	16	59	2			12
Spears	101	37	4	15		40	76	
Dredges:								
Clam	34	22	7		18		5	2
Yards at mouth	17	9	3		9		2	4
Oyster	18						2	
Yards at mouth	18						3	
Scallop	862	501	613		496		756	
Yards at mouth	683	447	513		337		622	
Tongs	69	81			20		48	
Rakes	375	88	117		74		108	
Forks	42	5		480		140	12	185
Hoes	126			192		20	102	

CATCH: By counties

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	487,000	$4,480	18,504	$185	657,475	$6,991	237,540	$2,553
Bluefish	97,525	10,850	5,662	460	24,168	3,309	60,254	4,869
Bonito	15,380	1,166	1,500	90	5,755	429		
Butterfish	406,602	27,048	18,395	1,368	87,797	5,723	114,407	9,450
Carp							335	13
Catfish and bullheads	37,000	370						
Cod	3,731,830	112,331	1,741,699	47,933	206,360	5,638	25,699,177	660,376
Croaker			94,615	4,264			241,955	6,487
Cunner							349,151	15,581
Cusk	157,630	1,820	154	2			2,055,723	34,736
Drum:								
Black							756	8
Red							220	4
Eels	155,350	8,776	33,350	2,319	57,500	4,275	20,450	1,501
Flounders	4,422,184	108,341	5,434,371	266,696	1,001,379	31,748	2,410,602	101,143
Goosefish							150	2
Grayfish	2,330	32			35,000	350		
Haddock	2,930,400	88,267	7,863,768	246,398	146,520	4,656	43,776,776	1,336,351
Hake	574,572	9,634	80,670	1,432	7,200	120	3,226,566	54,302
Halibut	12,742	1,919	36,692	5,236			2,052,965	267,613
Herring, sea	3,134,964	41,523	51,600	588	2,950	30	796,900	9,471
Hogfish							6,367	137
Kingfish or "king mackerel"							30	1
King whiting or "kingfish"			60	2			2,029	69
Mackerel	3,942,929	131,442	261,000	8,590	243,345	14,638	24,660,224	1,050,941
Minnows	1,250	375						
Mullet			223	13				
Pollock	158,653	2,106	42,914	594	2,750	45	3,343,468	45,756
Rosefish							48,062	372
Salmon							38	8

Fisheries of Massachusetts, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sand launce	1,200	$24					240,000	$2,450
Scup or porgy	41,170	2,122	547,692	$21,340	84,562	$3,885	845,207	22,204
Sea bass	8,100	1,004	173,558	8,271	1,900	168	399,919	8,957
Shad	7,300	407					139,603	6,489
Sharks	2,160	37	34,454	145			16,854	188
Skates	100	2	2,000	20			100	1
Smelt							1,600	520
Spot							40	1
Squeteagues or "sea trout":								
Gray	400	32	7,143	469			94,075	4,084
Spotted	237	23	2,000	200	500	58		
Striped bass	33,600	5,886			2,000	300	12,000	2,130
Sturgeon			585	47			2,736	462
Swordfish	286,825	42,915	133,140	22,190	183,510	19,293	1,366,046	299,408
Tautog	38,700	2,018	128,308	5,348	9,478	478	315	10
Tomcod			31,900	319				
Tuna or "horse mackerel"	62,962	4,118			1,575	110	917	72
White perch	1,500	270			7,000	910	25	1
Whiting	5,720,168	53,132	360	4	3,900	39	657,600	5,295
Wolffish	59,548	1,008	40,952	726			429,605	9,343
Yellow perch			350	28	8,840	1,623	400	4
Crabs, hard							29,680	4,911
Lobsters	272,992	78,718	288,840	75,952	283,103	68,109	668,007	194,864
Shrimp	1,000	925						
Squid	1,113,080	23,082	24,050	255	61,230	1,016	39,345	873
Clams:								
Cockle	16,758	3,063					5,184	1,056
Hard, public	1,124,304	145,216	614,900	86,813	255,122	36,058	49,147	4,408
Hard, private	66,825	15,225	231,000	29,750				
Razor	347,392	16,522					32,000	1,500
Soft	102,200	12,400	4,250	560			2,440,692	240,352
Surf or skimmers							35,700	3,150
Oysters:								
Market, private, spring	124,315	58,140						
Market, private, fall	122,586	56,475	4,375	875				
Periwinkles	11,700	1,950						
Scallops:								
Bay	819,460	209,422	180,500	34,555	258,750	64,760		
Sea	87,000	11,925	391,833	43,568	900	100		
Bloodworms							6,811	6,130
Sandworms							13,622	9,200
Total	30,741,923	1,296,541	18,527,367	917,605	3,640,569	274,859	116,631,375	4,429,807

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			15,000	$150	744,800	$7,004	51,700	$739
Bluefish	3,000	$300					430	22
Bonito	8,100	648						
Butterfish	1,685	114			22,600	1,356	81,527	6,239
Carp							520	30
Cod	1,040,615	30,587	13,200	360	139,590	3,807	40,705,452	1,054,258
Croaker	12,994	491					148,929	4,238
Cunner							600	14
Cusk							2,853,393	51,845
Drum:								
Black							124	2
Red							213	3
Eels	66,000	4,290	16,000	1,120	19,700	1,379	9,844	109
Flounders	3,541,542	152,795	3,500	125	6,000	300	8,900,493	380,506
Grayfish	7,000	72						
Haddock	1,274,900	37,992			14,630	665	94,424,177	2,842,283
Hake	18,377	308					6,253,765	125,775
Halibut	5,060	711					669,427	95,746
Herring, sea					892,755	6,695	3,000,000	37,500
Hogfish							4,382	79
Kingfish or "king mackerel"							169	4
King whiting or "kingfish"							985	30
Mackerel	43,200	1,470	2,500	125	35,370	1,545	10,269,908	421,651
Pollock	11,000	150			1,320	24	4,360,340	64,643
Rosefish							175,350	2,517
Scup or porgy	10,784	432					423,452	8,479
Sea bass	3,199	161					184,473	3,792
Sea robin							150	4
Shad	3,200	224					375	16

Fisheries of Massachusetts, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sharks	2,160	$95					7,120	$94
Skates							50,890	445
Smelt			2,500	$375			680	34
Squeteagues or "sea trout", gray	6,815	258					41,534	1,499
Sturgeon							2,073	209
Swordfish	30,240	4,896					158,059	33,164
Tautog					10,000	$600		
Whiting	1,500	30			367,162	1,987	179,709	4,042
Wolffish							1,529,962	30,934
Crabs, hard			8,320	1,560	7,416	1,525	163,740	20,754
Lobsters	32,073	8,858	110,136	30,382	501,843	143,315	88,759	27,000
Squid	8,815	174			100	3	9,501	206
Clams:								
Cockle					16,920	2,820		
Hard, public	451,308	54,816			135,300	18,450		
Razor					89,600	3,360		
Soft			331,500	32,500	210,800	18,450	580,000	58,500
Surf or skimmers					34,000	2,000		
Mussels							26,851	4,914
Oysters:								
Market, public, spring					1,312	400		
Market, private, spring					8,584	1,962		
Market, private, fall					7,595	1,736		
Seed, private, spring					52,500	2,400		
Periwinkles					5,400	450		
Scallops:								
Bay	223,956	56,244			107,125	27,870		
Sea	11,070	1,380			2,700	450	160	12
Irish moss					89,250	4,969		
Bloodworms			37,777	34,000			10,733	9,660
Sandworms			17,777	12,000			21,465	14,490
Total	6,818,593	357,496	558,210	112,697	3,524,372	255,522	175,391,414	5,306,481

RHODE ISLAND

Fisheries of Rhode Island, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines, mackerel	Haul seines	Gill nets		Lines		Pound nets	Floating traps
			Drift	Run-around	Hand	Trawl		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	4		8		38	25		
On boats and shore:								
Regular	3	19	2	24	167	30	40	175
Casual		30			20		2	
Total	7	49	10	24	225	55	42	175
Vessels:								
Motor	1		3		17	10		
Net tonnage	7		30		125	71		
Boats:								
Motor	1	7	1	4	118	17	13	25
Other	1	13	1	11	45		33	63
Accessory boats			4			7		
Apparatus:								
Number	2	16	126	11	373	1,562	54	63
Length, yards	320	2,075						
Square yards			44,640	13,100				
Hooks, baits, or snoods					539	75,380		

Fisheries of Rhode Island, 1931—Continued

OPERATING UNITS: By GEAR—Continued

Item	Fyke nets	Dip nets	Push nets	Otter trawls	Pots			Harpoons	Spears
					Eel	Lobster	Periwinkle and cockle		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				117		42		89	
On boats and shore:									
Regular	18	28	2	53	29	308	25	51	27
Casual			4	2	8	76	2		6
Total	18	28	6	172	37	426	27	140	33
Vessels:									
Motor				46		18		31	
Net tonnage				406		127		252	
Boats:									
Motor	11	14		35	23	257	22	31	6
Other	7		6		15	71		31	17
Accessory boats								31	
Apparatus:									
Number	154	28	6	81	1,839	40,777	1,690	62	33
Yards at mouth				2,230					

Item	Dredges			Tongs	Rakes	Forks	Hoes	By hand	Total, exclusive of duplication
	Clam	Oyster	Scallop						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	19	69							233
On boats and shore:									
Regular	7		110	277	76	10	5	13	822
Casual	6		88	212	10	20	8	18	416
Total	32	69	198	489	86	30	13	31	1,471
Vessels:									
Steam		3							3
Net tonnage		126							126
Motor	6	13							77
Net tonnage	68	237							793
Total vessels	6	16							80
Total net tonnage	68	363							919
Boats:									
Motor	4		110	140	19				513
Other				353	46		13		573
Accessory boats									42
Apparatus:									
Number	11	32	573	489	86	30	13		
Yards at mouth	5	47	442						

CATCH: By GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Run-around	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			12,000	$1,080	7,000	$700	34,200	$4,080
Butterfish					2,000	200		
Eels			60,210	5,197				
Flounders			300	18				
Mackerel	157,500	$5,561			86,000	2,435		
Smelt			9,500	1,900				
Squeteague or "sea trout," gray			6,500	780	1,000	120	800	96
Striped bass			2,000	400				
Tautog			2,000	120				
Tomcod			1,200	24				
Total	157,500	5,561	93,710	9,519	96,000	3,455	35,000	4,176

Fisheries of Rhode Island, 1931—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets		Floating traps	
	Hand		Trawl					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore							1,900	$38
Alewives					85,196	$658	41,532	424
Bluefish	3,700	$338			1,600	113	62,591	5,741
Bonito							21,485	1,262
Butterfish					158,100	8,053	592,600	30,862
Cod	581,427	22,823	135,387	$5,488	143	4	149,380	4,053
Cunner					1,000	40		
Eels	13,411	1,240			59,950	3,911	1,093	75
Flounders			1,400	70	36,450	2,028	263,898	12,701
Frigate mackerel							1,200	20
Haddock	16,910	601	295,076	11,234			6,633	241
Hake	9,330	194	2,950	70			9,565	160
Herring, sea					160,900	3,058	74,255	1,109
Mackerel	4,500	225			172,900	4,620	1,002,250	31,140
Menhaden					1,900	27	1,577	16
Pollock	35,697	581	2,820	42			44,014	683
Scup or porgy					11,400	426	1,166,000	56,810
Sea bass							41,938	2,619
Sea robin					5,600	86	95,600	1,170
Shad					10,440	592	7,530	501
Skates	4,500	90	5,000	50	5,000	50	2,981	30
Smelt					1,340	268		
Squeteague or "sea trout", gray	400	40			15,950	1,242	27,500	2,358
Striped bass	550	110			850	173	35,626	4,980
Sturgeon							200	22
Tautog	134,000	6,784			51,050	2,158	40,700	1,673
Tomcod					3,000	45		
Tuna or "horse mackerel"	29,700	2,458					71,225	5,697
White perch					2,376	119		
Whiting					49,100	538	895,200	13,062
Yellow perch					2,800	302		
Squid					102,900	1,950	1,393,800	27,388
Total	834,125	35,484	442,633	16,954	939,945	30,461	6,052,273	204,835

Species	Fyke nets		Dip nets		Push nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod							38,675	$1,336
Cunner			102,000	$3,450				
Eels	13,200	$792						
Flounders	41,500	1,573					5,740,942	128,906
Haddock							33,720	1,197
Hake							21,250	355
Sharks							3,000	30
Skates							596,790	5,350
Tautog	20,900	838						
Whiting							60,650	1,113
Scallops, bay					315	$88		
Total	75,600	3,203	102,000	3,450	315	88	6,495,027	138,287

Species	Pots						Harpoons	
	Eel		Lobster		Periwinkle and cockle			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	128,076	$8,823						
Swordfish							456,158	$74,439
Crabs, hard			154,667	$7,490				
Lobsters			1,259,173	269,231				
Clams: Cockle			15,300	850	81,918	$5,216		
Periwinkles			16,200	900	70,200	4,350		
Total	128,076	8,823	1,445,340	278,471	152,118	9,566	456,158	74,439

Fisheries of Rhode Island, 1931—Continued

CATCH: BY GEAR—Continued

Species	Spears		Dredges					
			Clam		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	26,723	$2,369						
Clams:								
Hard, public			28,615	$6,398				
Hard, private			114,224	22,568				
Oysters:								
Market, private, spring			322	60	1,076,302	$232,907		
Market, private, fall					1,335,104	306,057		
Market, public, fall			1,350	200				
Scallops, bay							107,393	$35,183
Total	26,723	2,369	144,511	29,226	2,411,406	538,964	107,393	35,183

Species	Tongs		Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:										
Hard, public	1,268,531	$198,134	153,945	$24,792						
Soft, public					9,000	$1,800	10,748	$1,405		
Oysters:										
Market, private, fall	2,187	438								
Seed, public, spring									2,322	$172
Seed, public, fall									40,420	3,593
Total	1,270,718	198,572	153,945	24,792	9,000	1,800	10,748	1,405	42,742	3,765

OPERATING UNITS: BY COUNTIES

Item	Bristol	Kent	Newport	Providence	Washington
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	35	12	128	33	25
On boats and ashore:					
Regular	94	190	354	23	161
Casual	67	119	79	76	75
Total	196	321	561	132	261
Vessels:					
Steam				3	
Net tonnage				126	
Motor	10	3	50	4	10
Net tonnage	134	34	445	96	84
Total vessels	10	3	50	7	10
Total net tonnage	134	34	445	222	84
Boats:					
Motor	50	137	189	24	113
Other	74	190	165	57	87
Accessory boats			38	1	3
Apparatus:					
Purse seines, mackerel			2		
Length, yards			320		
Haul seines	1	2	1	8	4
Length, yards	100	150	100	605	1,120
Gill nets:					
Drift		2	124		
Square yards		2,400	42,240		
Runaround			10		1
Square yards			2,100		11,000
Lines:					
Hand	7	4	266	11	85
Hooks	14	2	353	2	168
Trawl			1,442		120
Hooks			69,380		6,000
Pound nets	1		34	1	18
Floating traps			46		17
Fyke nets	8	41	100		5
Dip nets			28		
Push nets	6				
Otter trawls	1	1	55		24
Yards at mouth	25	30	1,540		635

Fisheries of Rhode Island, 1931—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Bristol	Kent	Newport	Providence	Washington
Apparatus—Continued					
Pots:	*Number*	*Number*	*Number*	*Number*	*Number*
Eel	220	455	232	177	755
Lobster	3,512	1,925	23,380	350	11,610
Periwinkle and cockle	540		775		375
Harpoons			54	2	6
Spears	1	11		11	10
Dredges:					
Clam	1	7	3		
Yards at mouth	1	3	1		
Oyster	16	2		10	4
Yards at mouth	23	3		15	6
Scallop	52	319	74	8	120
Yards at mouth	43	246	54	6	93
Tongs	97	226	39	63	64
Rakes		40	31		15
Forks					30
Hoes	7			6	

CATCH: BY COUNTIES

Species	Bristol		Kent		Newport		Providence		Washington	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Albacore					1,900	$38				
Alewives	22,176	$56			69,432	608	1,620	$20	33,500	$398
Bluefish			7,000	$700	85,491	8,805			28,600	2,547
Bonito					20,885	1,226			600	36
Butterfish			2,000	200	650,850	33,805			99,850	5,110
Cod	2,576	126			793,971	28,450			108,465	5,128
Cunner					103,000	3,490				
Eels	9,359	907	47,031	3,729	80,450	4,961	82,873	7,540	82,950	5,270
Flounders	42,712	1,310	36,430	1,627	4,454,548	97,240			1,550,800	45,119
Frigate mackerel									1,200	20
Haddock					351,239	13,223			1,100	50
Hake					22,395	434			20,700	345
Herring, sea					216,155	3,894			19,000	273
Mackerel					1,296,650	40,496			126,500	3,485
Menhaden					1,977	20			1,500	23
Pollock					50,411	813			32,120	493
Scup or porgy					1,117,300	54,832			60,100	2,404
Sea bass					41,838	2,612			100	7
Sea robin					82,900	1,048			18,300	208
Shad	5,040	322			7,230	465	5,400	270	300	36
Sharks					3,000	30				
Skates					238,781	2,703			375,490	2,867
Smelt					340	68			10,500	2,100
Squeteague or "sea trout", gray			1,400	160	16,950	1,415			33,800	3,061
Striped bass					34,676	4,853			4,350	810
Sturgeon					200	22				
Swordfish					425,718	69,696	6,200	651	24,240	4,092
Tautog	10,300	602	20,800	832	131,700	6,085	1,000	58	84,850	3,996
Tomcod					3,000	45			1,200	24
Tuna or "horse mackerel"					100,925	8,155				
White perch	2,376	119								
Whiting					829,950	12,238			175,000	2,475
Yellow perch					2,800	302				
Crabs, hard	124,667	3,740			30,000	3,750				
Lobsters	41,811	14,735	28,948	7,554	937,036	192,738	4,644	1,297	246,734	52,907
Squid					990,700	19,734			506,000	9,604
Clams:										
Cockle					61,020	4,053			36,198	2,013
Hard, public	204,512	27,887	925,892	149,197	100,665	15,990	69,322	9,625	150,700	26,625
Hard, private	66,000	13,050	48,224	9,518						
Soft, public	5,148	617					5,600	788	9,000	1,800
Oysters:										
Market, private, spring	520,858	84,754	81,633	15,118			212,728	64,828	261,405	68,267
Market, private, fall	607,824	100,151	48,074	8,903			425,456	132,656	255,937	64,785
Market, public, fall			1,350	200						
Seed, public, spring	2,322	172								
Seed, public, fall	40,420	3,593								
Periwinkles	54,000	3,000			32,400	2,250				
Scallops, bay	11,079	2,210	49,253	16,345	22,950	8,638	576	128	23,850	7,950
Total	1,773,180	257,351	1,298,035	214,083	13,411,433	649,225	815,419	217,861	4,384,939	324,328

CONNECTICUT

Fisheries of Connecticut, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines	
	Mackerel	Other		Drift	Stake	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	13	15				31	45
On boats and shore:							
Regular	6		11	8	2	70	4
Casual	10		151	94	3	51	8
Total	29	15	162	102	5	152	57
Vessels:							
Motor	4	1				9	3
Boats: Net tonnage	35	47				116	122
Motor	111		3	44	1	72	6
Other			44	7	2	5	
Accessory boats	6					3	36
Apparatus:							
Number	6	1	68	51	10	318	912
Length, yards	642	400	3,646				
Square yards				125,023	4,360		
Hooks, baits, or snoods						381	43,056

Item	Pound nets	Fyke nets	Dip nets	Otter trawls	Pots			Harpoons
					Crab	Eel	Lobster	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				494			9	60
On boats and shore:								
Regular	16	7	3	82		22	133	13
Casual	6	28	42	35	1	46	134	
Total	22	35	45	611	1	68	276	73
Vessels:								
Steam				17				
Net tonnage				3,282				
Motor				47			4	14
Net tonnage				620			30	206
Total vessels				64			4	14
Total net tonnage				3,902			30	206
Boats:								
Motor	2	2	1	66		7	195	5
Other	10	25	23		1	56	20	
Accessory boats	5	1						20
Apparatus:								
Number	18	128	45	130	12	1,689	20,048	19
Yards at mouth				3,413				

Item	Spears	Dredges, oyster	Tongs	Rakes	Forks	Hoes	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		246	2					790
On boats and shore:								
Regular	15	24	112	19	7	2	8	332
Casual	47	8	71	22	3	6	2	621
Total	62	278	185	41	10	8	10	1,743
Vessels:								
Steam		7						24
Net tonnage		1,117						4,399
Motor		50	1					103
Net tonnage		708	6					1,473
Sail		3						3
Net tonnage		25						25
Total vessels		60	1					130
Total net tonnage		1,850	6					5,897
Boats:								
Motor	7	19	9		1			332
Other	50		171	39	6	8	1	363
Accessory boats								71
Apparatus:								
Number	62	284	185	41	10	8		
Yards at mouth		276						

Fisheries of Connecticut, 1931—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Other				Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					3,000	$77				
Carp					6,350	756			11,933	$1,343
Mackerel	407,850	$11,507								
Minnows					21,895	9,055	240	$240		
Mummichog					1,300	351				
Scup or porgy			52,258	$916						
Shad					21,239	3,263	53,159	9,956		
Smelt					2,150	443				
Squeteagues or "sea trout," gray			323	15						
Suckers					36,750	2,144				
Tomcod					2,000	200				
Total	407,850	11,507	52,581	931	94,684	16,289	53,399	10,196	11,933	1,343

Species	Lines				Pound nets		Fyke nets		Dip nets	
	Hand		Trawl							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					2,916	$44	13,248	$276	7,600	$228
Bluefish	399,164	$32,447			8,364	783				
Bonito	371	19								
Butterfish					12,295	1,011	250	36		
Carp							5,313	563		
Catfish and bullheads							400	20		
Cod	76,237	1,322	423,779	$6,560						
Cunner	100	20								
Eels			24,238	833	3,711	431	11,144	1,342		
Flounders					16,943	1,319				
Haddock			437,500	7,000						
Hake			132,613	2,152						
King whiting or "kingfish"					15	2				
Mackerel					2,275	74				
Menhaden					1,700	17				
Minnows									950	500
Pike or pickerel							400	42		
Pollock	7,500	38	62,500	1,000						
Scup or porgy	4,200	188			660	24				
Sea bass	130,000	5,010			98	15				
Sea robin					1,300	13				
Shad									716	88
Skates			4,226	50	1,200	6				
Squeteagues or "sea trout", gray	71	8			24,000	2,375	125	18		
Striped bass	1,900	228			1,841	269				
Suckers							69,825	3,560		
Tautog	41,431	2,239			7,475	362				
Tilefish			1,636,943	65,044						
Tuna or "horse mackerel"	8,800	380								
White perch							100	5		
Yellow perch							700	25		
Crabs:										
Hard									16,667	1,656
Soft									2,240	792
Squid					5,600	81				
Total	669,774	41,899	2,721,799	82,639	90,393	6,826	101,505	5,887	28,173	3,264

Fisheries of Connecticut, 1931—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls		Pots					
			Crab		Eel		Lobster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	720	$15						
Butterfish	6,981	426						
Catfish and bullheads	14,836	305						
Cod	5,129,150	122,024						
Cusk	38,031	799						
Drum, red	189	2						
Eels	3,055	71			81,100	$8,417		
Flounders	8,680,694	194,593						
Goosefish	12,400	62						
Haddock	17,983,985	454,256						
Hake	437,692	8,432						
Halibut	55,638	8,952						
King whiting or "kingfish"	897	27						
Mackerel	20,562	438						
Pollock	708,080	8,588						
Rosefish	4,090	72						
Scup or porgy	8,387	259						
Sea bass	68,902	1,735						
Sea robin	27,370	283						
Sharks	245	5						
Skates	193,770	1,469						
Squeteagues or "sea trout", gray	3,604	130						
Sturgeon	31	9						
Tautog	1,200	48						
Whiting	129,100	2,322						
Wolffish	36,885	664						
Crabs, hard			500	$15				
Lobsters	30	12					497,464	$138,156
Squid	1,908	38						
Periwinkles							6,120	170
Scallops, sea	423	49						
Total	33,568,855	806,085	500	15	81,100	8,417	503,584	138,326

Species	Harpoons		Spears		Dredges, oyster		Tongs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			48,441	$5,613				
Swordfish	253,738	$24,882						
Clams:								
Hard, public							97,649	$31,079
Hard, private							1,100	350
Oysters:								
Market, public, spring					417	$31	22,380	2,544
Market, public, fall					924	68	23,702	2,613
Market, private, spring					547,491	57,937	8,069	2,697
Market, private, fall					771,501	93,392	4,602	1,335
Seed, public, spring					270,908	30,068	59,560	5,919
Seed, public, fall					324,403	29,969	316,572	28,608
Seed, private, spring					3,565,257	412,175	84,899	8,592
Seed, private, fall					832,897	123,554	27,149	2,600
Total	253,738	24,882	48,441	5,613	6,313,798	747,194	645,682	86,337

Species	Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	21,101	$6,719						
Soft, public			43,200	$5,085	14,000	$1,901		
Oysters:								
Market, public, spring	178	25					910	$155
Market, public, fall	1,247	250					910	190
Seed, public, spring	3,938	383					3,125	347
Seed, public, fall	16,875	1,750					17,125	1,522
Bloodworms			51	225				
Total	43,339	9,127	43,251	5,310	14,000	1,901	22,070	2,214

Fisheries of Connecticut, 1931—Continued

OPERATING UNITS: By counties

Item	Fairfield	Hartford	Middlesex	New Haven	New London
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	151			156	483
On boats and shore:					
Regular	142	2	31	40	117
Casual	43	136	129	123	190
Total	336	138	160	319	790
Vessels:					
Steam	4			4	16
Net tonnage	298			1,027	3,074
Motor	35			30	38
Net tonnage	474			457	542
Sail	3				
Net tonnage	25				
Total vessels	42			34	54
Total net tonnage	797			1,484	3,616
Boats:					
Motor	50	2	73	60	147
Other	137	40	45	69	72
Accessory boats			1	1	69
Apparatus:					
Purse seines:					
Mackerel					6
Length, yards					642
Other					1
Length, yards					400
Haul seines	1	39	9	11	8
Length, yards	85	2,229	958	125	249
Gill nets:					
Drift		1	42		8
Square yards		2,100	105,017		17,906
Stake			10		
Square yards			4,360		
Lines:					
Hand	16		73	41	188
Hooks	32		76	43	230
Trawl					912
Hooks					43,056
Pound nets			1	1	16
Fyke nets		92	10	5	21
Dip nets		19	1		25
Otter trawls	13		16	14	87
Yards at mouth	287		286	307	2,533
Pots:					
Crab			12		
Eel	150	22	382	83	1,052
Lobster	4,410	50	1,500	3,540	10,548
Harpoons	1		1	1	16
Spears	11		2	19	30
Dredges, oyster	201			83	
Yards at mouth	178			98	
Tongs	125		15	39	6
Rakes	38				3
Forks			7	2	1
Hoes			3		5

CATCH: By counties

Species	Fairfield		Hartford		Middlesex		New Haven		New London	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	720	$15	20,848	$504	2,000	$45			3,916	$76
Bluefish					53,864	5,809	24,124	$2,982	329,540	24,439
Bonito									371	19
Butterfish	836	32			200	14	1,750	141	16,740	1,286
Carp			6,138	801	16,783	1,834	175	12	500	15
Catfish and bullheads					400	20	10,255	216	4,581	89
Cod	3,289	230					194,960	6,277	5,430,917	123,399
Cunner							100	20		

Fisheries of Connecticut, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Fairfield		Hartford		Middlesex		New Haven		New London	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cusk							8,975	$263	29,056	$536
Drum, red	189	$2								
Eels	22,429	3,001	8,111	$920	40,792	$4,387	11,034	1,200	89,323	7,199
Flounders	337,389	17,705			147,722	3,402	676,425	16,435	7,536,101	158,370
Goosefish									12,400	62
Haddock							778,970	26,497	17,642,515	434,759
Hake	19,603	339					109,400	3,408	441,302	6,837
Halibut							4,547	1,032	51,091	7,920
King whiting or "kingfish"	897	27							15	2
Mackerel							6,500	49	424,187	11,970
Menhaden									1,700	17
Minnows			10,585	6,145	6,400	1,000	6,100	2,650		
Mummichog							200	200	1,100	151
Pike or pickerel			300	39					100	3
Pollock							18,600	343	759,480	9,283
Rosefish							4,090	72		
Scup or porgy	1,587	59							63,918	1,328
Sea bass	67,302	2,037					4,000	160	127,698	4,563
Sea robin	370	3							28,300	293
Shad			21,631	3,344	45,035	8,053			8,448	1,910
Sharks									245	5
Skates	10,036	100					4,450	18	184,710	1,407
Smelt	500	200							1,650	243
Squeteagues or "sea trout", gray	3,604	130			71	8	2,625	178	21,823	2,230
Striped bass									3,741	497
Sturgeon									31	9
Suckers			66,600	3,706	36,000	1,880	175	12	3,800	106
Swordfish	20,846	2,500			2,360	319	1,500	90	229,032	21,973
Tautog	2,024	203			12,769	755	1,860	208	33,453	1,483
Tilefish									1,636,943	65,044
Tomcod	2,000	200								
Tuna or "horse mackerel"									8,800	380
White perch									100	5
Whiting							11,300	363	117,800	1,959
Wolffish									36,885	664
Yellow perch					200	10			500	15
Crabs:										
Hard					540	24			16,627	1,647
Soft									2,240	792
Lobsters	96,650	33,773	300	90	53,426	14,995	91,706	27,878	255,412	61,432
Squid	1,908	38							5,600	81
Clams:										
Hard, public	99,132	31,543					18,338	5,925	1,280	330
Hard, private	1,100	350								
Soft, public					38,700	4,023	11,000	1,775	7,500	1,188
Oysters:										
Market, public, spring					9,404	1,157	13,769	1,473	712	125
Market, public, fall					7,939	986	17,062	1,785	1,782	350
Market, private, spring	70,943	14,607					477,017	43,691	7,600	2,336
Market, private, fall	153,617	29,413					618,486	64,046	4,000	1,268
Seed, public, spring	322,934	34,892					12,737	1,593	1,860	232
Seed, public, fall	657,716	59,859					16,959	1,945	300	45
Seed, private, spring	1,096,449	113,591			540	60	2,553,167	307,116		
Seed, private, fall	67,865	6,032			810	90	791,371	120,032		
Periwinkles							6,120	170		
Scallops, sea									423	49
Bloodworms									51	225
Total	3,061,935	350,881	134,513	15,549	475,955	48,871	6,509,847	640,255	35,588,199	960,646

FISHERIES OF THE MIDDLE ATLANTIC STATES

(Area XXIII)[4]

The yield of fishery products in the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware) during 1931 amounted to 164,898,737 pounds, valued at $9,211,180. This is a decrease of 15 percent in the amount of the catch and 29 percent in the value of the catch as compared with the quantity and its value for 1930. Of the total catch in 1931, 113,401,316 pounds, valued at $2,949,625, were fish; and 51,497,421 pounds, valued at $6,261,555, were shellfish and miscellaneous products. These fisheries gave employment to 9,604 fishermen, or 5 percent less than in 1930. Of the total number of fishermen employed during 1931, 3,925 regular fishermen were engaged on vessels and 2,913 regular and 2,766 casual fishermen were employed in the shore and boat fisheries.

Fisheries of the Middle Atlantic States, 1931

SUMMARY OF CATCH

Product	New York		New Jersey		Pennsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	37,261,331	$967,369	57,143,403	$1,725,803	76,080	$4,648
Shellfish, etc	13,732,402	2,006,753	35,702,130	4,128,439		
Total	50,993,733	2,974,122	92,845,533	5,854,242	76,080	4,648

Product	Delaware		Total	
	Pounds	*Value*	*Pounds*	*Value*
Fish	18,920,502	$251,805	113,401,316	$2,949,625
Shellfish, etc	2,062,889	126,363	51,497,421	6,261,555
Total	20,983,391	378,168	164,898,737	9,211,180

OPERATING UNITS: BY STATES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	700	3,021		204	3,925
On boats and shore:					
Regular	1,345	1,389		179	2,913
Casual	1,071	1,266	75	354	2,766
Total	3,116	5,676	75	737	9,604
Vessels:					
Steam	1			2	3
Net tonnage	96			230	326
Motor	167	274		16	457
Net tonnage	2,408	4,257		326	6,991
Sail	1	61		3	65
Net tonnage	6	1,591		39	1,636
Total vessels	169	335		21	525
Total net tonnage	2,510	5,848		595	8,953

[4] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area craft owned in the area but at times fishing elsewhere. A notable example is the southern trawl fishery which extends into area XXIV.

Fisheries of the Middle Atlantic States, 1931—Continued

OPERATING UNITS: By States—Continued

Item	New York	New Jersey	Pennsylvania	Delaware	Total
	Number	*Number*	*Number*	*Number*	*Number*
Boats:					
Motor	619	1,178	5	73	1,875
Other	1,132	673	17	185	2,007
Accessory boats	65	101		32	198
Apparatus:					
Purse seines:					
Menhaden	5	2		3	10
Length, yards	1,680	806		1,200	3,686
Other	1	16			17
Length, yards	400	6,100			6,500
Haul seines	174	114	16	78	382
Length, yards	16,269	12,166	1,995	22,175	52,605
Gill nets:					
Anchor	99	1			100
Square yards	63,552	900			64,452
Drift	252	1,076	7	75	1,410
Square yards	358,690	719,060	15,530	195,285	1,288,565
Runaround	24	87		48	159
Square yards	59,714	254,195		44,100	358,009
Stake	60	942		167	1,169
Square yards	22,699	118,010		15,760	156,469
Lines:					
Hand	176	928		32	1,136
Hooks	278	1,185		64	1,527
Trawl	236	836		26	1,098
Hooks	184,400	504,550		18,900	707,850
Troll	16				16
Hooks	16				16
Trot with baits or snoods	4	3		1	8
Baits or snoods	2,800	625		50	3,475
Trot with hooks	26				26
Hooks	3,740				3,740
Pound nets	446	186		59	691
Floating traps	6				6
Weirs		109			109
Stop nets	19	61		39	119
Square yards	8,398	69,300		9,584	87,282
Fyke nets	1,845	1,324	30	333	3,532
Dip nets	53	50		34	137
Cast nets		4		4	8
Scap nets	252				252
Drag nets	22	16			38
Yards at mouth	64	37			101
Push nets	16				16
Otter trawls	106	58			164
Yards at mouth	2,580	1,332			3,912
Wire baskets		4			4
Pots:					
Crab	36	25			61
Eel	4,680	3,690		805	9,175
Lobster	17,463	30,678		160	48,301
Harpoons	18				18
Spears	135	84		6	225
Dredges:					
Clam	16	32		20	68
Yards at mouth	16	31		17	64
Conch	2				2
Yards at mouth	7				7
Crab	6	38			44
Yards at mouth	5	50			55
Mussel	4				4
Yards at mouth	5				5
Oyster	102	495		34	631
Yards at mouth	142	583		42	767
Scallop	1,065	4			1,069
Yards at mouth	752	11			763
Tongs	577	847		87	1,511
Rakes	468	573			1,041
Forks	320	45			365
Hoes		192			192
Gaffs		5		1	6

Fisheries of the Middle Atlantic States, 1931—Continued

CATCH: BY STATES

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	790,040	$9,832	390,150	$7,699	42,000	$550	2,434,186	$10,720	3,656,376	$28,801
Bluefish	671,202	50,807	2,534,911	176,882			70,818	3,677	3,276,931	231,366
Bonito	446,983	20,219	279,642	14,083					726,625	34,302
Butterfish	2,215,871	105,784	4,320,505	205,143					6,536,376	310,927
Carp	169,981	16,565	143,540	18,567	1,505	201	74,170	7,679	389,196	43,012
Catfish and bullheads	15,867	2,605	43,205	2,522	1,000	110	27,523	2,628	87,595	7,865
Cero			2,000	80					2,000	80
Cod	1,465,519	38,147	6,221,247	160,055			50,628	1,775	7,737,394	199,977
Croaker	42,384	975	1,530,675	55,376			302,073	10,098	1,875,132	66,449
Cusk			4,400	132					4,400	132
Drum, red or redfish			4,860	64					4,860	64
Eels	497,878	52,723	565,522	55,419			86,163	10,308	1,149,563	118,450
Flounders	7,194,910	275,414	3,344,221	135,790			72,699	4,930	10,611,830	416,134
Frigate mackerel	4,365	86							4,365	86
Goosefish	822	8	4,200	53					5,022	61
Grayfish	1,196	36	3,600	54					4,796	90
Haddock	1,410,585	30,135	10,208	173					1,420,793	30,308
Hake	59,402	1,374	182,907	2,732					242,309	4,106
Halibut	1,640	220							1,640	220
Herring, sea	46,891	729	456,306	7,854			1,314	4	504,511	8,587
Kingfish or "king mackerel"	13,963	928	45,000	1,350					58,963	2,278
King whiting or "kingfish"	87,473	6,147	59,848	4,806			1,890	78	149,211	11,031
Mackerel	322,578	14,536	235,942	11,101					558,520	25,637
Menhaden	16,184,664	39,207	10,101,263	49,098			14,280,600	93,299	40,566,527	181,604
Mullet	20,295	1,203	52,704	1,707			582,517	39,827	655,516	42,737
Mummichog	101,740	8,041	9,457	874					111,197	8,915
Pigfish			3,635	95					3,635	95
Pike or pickerel	650	88							650	88
Pilotfish			115	1					115	1
Pollock	53,855	1,055	1,397	65					55,252	1,120
Scup or porgy	1,336,982	30,631	7,249,470	145,446			12,600	906	8,599,052	176,983
Sea bass	285,704	16,105	3,697,957	142,645			9,600	679	3,993,261	159,429
Sea robin	33,379	593	70,018	640					103,397	1,233
Shad	357,038	42,872	256,963	41,318	7,300	1,425	38,810	7,000	660,111	92,615
Sharks	1,022	21	29,780	594					30,802	615
Silversides	114,610	7,359	5,604	672					120,214	8,031
Skates	14,947	138	69,524	433					84,471	571
Smelts	769	216							769	216
Snapper, red			3,500	320					3,500	320
Spanish mackerel			234,604	34,016					234,604	34,016
Spot	66,779	3,183	204,535	6,663			200,495	7,122	471,809	16,968

Fisheries of the Middle Atlantic States, 1931—Continued

CATCH: BY STATES—Continued

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
FISH—Continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Squeteague or "sea trout," gray	1,466,816	$108,762	11,685,436	$364,788			400,027	$15,114	13,552,279	$488,664
Striped bass	64,321	8,314	18,379	3,938			52,274	11,697	134,974	23,949
Sturgeon	2,036	519	9,099	1,367			4,670	934	15,805	2,820
Suckers	35,617	3,490	66,095	5,651	24,275	$2,362			125,987	11,503
Sunfish	2,252	208							2,252	208
Swordfish	106,132	22,717							106,132	22,717
Tautog	65,872	3,714	75,282	2,005			58,500	1,755	199,654	7,474
Thimble-eyed mackerel			106,452	2,929					106,452	2,929
Tilefish	1,021,120	30,362							1,021,120	30,362
Tomcod	62,193	1,963	45	2					62,238	1,965
Tuna or "horse mackerel"	18,320	733	1,830	100					20,150	833
Whitebait	23,090	1,510							23,090	1,510
White perch	31,925	3,006	278,732	32,290			131,416	18,878	442,073	54,174
Whiting	326,365	3,656	2,407,513	23,337					2,733,878	26,993
Yellow perch	3,288	433	121,125	4,874			27,529	2,697	151,942	8,004
Total	37,261,331	967,369	57,143,403	1,725,803	76,080	4,648	18,920,502	251,805	113,401,316	2,949,625
SHELLFISH, ETC.										
Crabs:										
Hard	104,521	5,028	169,268	10,000					273,789	15,028
King			4,420,715	9,833			683,832	1,026	5,104,547	10,859
Soft	5,127	1,217	19,952	6,617			33,600	7,660	58,679	15,494
Lobsters	483,846	121,887	653,634	167,687			11,250	2,814	1,148,730	292,388
Shrimp	159,350	41,791	180,560	6,655					339,910	48,446
Squid	1,371,426	25,771	822,096	23,260					2,193,522	49,031
Clams:										
Hard, public [1]	1,108,932	355,661	1,319,263	318,327			25,453	4,548	2,453,648	678,536
Hard, private [1]	155,848	50,850	36,616	8,035					192,464	58,885
Razor	1,200	240							1,200	240
Soft, public [2]	323,715	38,628	1,218,900	95,856					1,542,615	134,484
Soft, private [2]	6,300	840							6,300	840
Surf or skimmers	315,984	17,878	181,250	10,100					497,234	27,978
Conchs	55,170	2,498							55,170	2,498
Mussels	169,600	8,153	4,100	281					173,700	8,434

Oysters:[3]										
Market, public, spring	45,486	6,512	69,607	10,771					115,093	17,283
Market, public, fall	143,223	23,341	92,224	12,172			106,260	10,540	341,707	46,053
Market, private, spring	2,855,515	441,963	408,965	84,381					3,264,480	526,344
Market, private, fall	3,629,706	553,672	13,831,121	1,579,044			364,294	42,517	17,825,121	2,175,233
Seed, public, spring	274,246	28,660	11,505,848	1,709,325			812,250	55,550	12,592,344	1,793,535
Seed, public, fall	126,133	11,086	80,660	5,582			24,300	1,620	231,093	18,288
Seed, private, spring	203,586	29,448	441,888	39,351					645,474	68,799
Seed, private, fall	12,238	2,529	77,423	7,067					89,661	9,596
Scallops:										
Bay	1,041,856	106,845	676	75					1,042,532	106,920
Sea	1,097,868	87,619	154,364	13,546					1,252,232	101,165
Terrapin, diamond-back			173	61					173	61
Turtles:										
Loggerhead			235	3					235	3
Snapper			2,535	330			1,650	88	4,185	418
Bloodworms	17,982	22,553	2,621	2,405					20,603	24,958
Sandworms	23,544	22,083	7,436	7,675					30,980	29,758
Total	13,732,402	2,006,753	35,702,130	4,128,439			2,062,889	126,363	51,497,421	6,261,555
Grand total	50,993,733	2,974,122	92,845,533	5,854,242	76,080	4,648	20,983,391	378,168	164,898,737	9,211,180

[1] Statistics on hard clams used in this table are based on yields of 8 pounds of meats to the bushel in New York and 9.36 pounds in New Jersey.
[2] Statistics on soft clams used in this table are based on yields of 15 pounds of meats to the bushel in New York and 20 pounds in New Jersey.
[3] Statistics on oysters used in this table are based on yields of 7 pounds of meats to the bushel for market oysters in New York, 9.89 pounds for market oysters in New Jersey and 6.6 pounds for market oysters in Delaware; and 7 pounds for seed oysters in New York, and 4.5 pounds for seed oysters in New Jersey and Delaware.

NOTE.—Of the total catch in New Jersey all of the cero were taken off the coast of Florida. In addition, 175,000 pounds of shrimp, valued at $3,875; 6,000 pounds of bluefish, valued at $250; 63,000 pounds of sea bass, valued at $2,640; 1,500 pounds of red snapper, valued at $120; and 11,000 pounds of Spanish mackerel, valued at $475 were taken off the coast of Florida. Of the total catch in New York, 414,097 pounds of fishery products, valued at $10,797 were taken in the southern winter trawl fishery off Maryland, Virginia, and North Carolina. Of the total catch in New Jersey, 2,474,121 pounds of fishery products, valued at $83,156 were taken in the same fishery. These products consisted principally of croaker flounders, scup, sea bass, and gray squeteague.

Fisheries of the Middle Atlantic States, 1931—Continued

PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	New York		New Jersey		Delaware		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:								
Hard, number	313,563	$5,028	507,804	$10,000			821,367	$15,028
King, do			1,204,554	9,833	186,330	$1,026	1,390,884	10,859
Soft, do	20,508	1,217	59,856	6,617	100,800	7,660	181,164	15,494
Clams:								
Hard, public, bushels	138,616	355,661	140,947	318,327	2,545	4,548	282,108	678,536
Hard, private, do	19,481	50,850	3,912	8,035			23,393	58,885
Razor, do	38	240					38	240
Soft, public, do	21,581	38,628	60,945	95,856			82,526	134,484
Soft, private, do	420	840					420	840
Surf or skimmers, do	26,332	17,878	14,500	10,100			40,832	27,978
Conchs, do	3,065	2,498					3,065	2,498
Mussels, do	16,960	8,153	410	281			17,370	8,434
Oysters:								
Market, public, spring, do	6,498	6,512	7,038	10,771			13,536	17,283
Market, public, fall, do	20,460	23,341	9,325	12,172	16,100	10,540	45,885	46,053
Market, private, spring, do	407,931	441,963	41,351	84,381			449,282	526,344
Market, private, fall, do	518,529	553,672	1,398,495	1,579,044	55,196	42,517	1,972,220	2,175,233
Seed, public, spring, do	39,178	28,660	2,556,855	1,709,325	180,500	55,550	2,776,533	1,793,535
Seed, public, fall, do	18,019	11,086	17,924	5,582	5,400	1,620	41,343	18,288
Seed, private, spring, do	29,084	29,448	98,197	39,351			127,281	68,799
Seed, private, fall, do	1,748	2,529	17,205	7,067			18,953	9,596
Scallops:								
Bay, do	208,371	106,845	150	75			208,521	106,920
Sea, do	182,978	87,619	25,727	13,546			208,705	101,165

Industries related to the fisheries of the Middle Atlantic States, 1931

OPERATING UNITS, SALARIES, AND WAGES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Transporting:					
Persons engaged:					
On vessels	55	22			77
On boats		167			167
Total	55	189			244
Vessels:					
Steam	1				1
Net tonnage	36				36
Motor	23	5			28
Net tonnage	295	124			419
Total vessels	24	5			29
Total net tonnage	331	124			455
Boats		134			134
Wholesale and manufacturing:					
Establishments	238	109	54	17	418
Persons engaged:					
Proprietors	195	121	59	18	393
Salaried employees	712	124	112	15	963
Wage earners:					
Average for season	1,804	1,113	476	240	3,633
Average for year	1,604	731	346	114	2,795
Paid to salaried employees	$2,447,009	$300,854	$309,600	$14,000	$3,071,463
Paid to wage earners	2,688,021	790,223	409,304	83,575	3,971,123
Total salaries and wages	5,135,030	1,091,077	718,904	97,575	7,042,586
Fishermen manufacturing	535	128		9	672

Industries related to the fisheries of the Middle Atlantic States, 1931—Continued

PRODUCTS MANUFACTURED

Item	New York		New Jersey		Pennsylvania		Delaware	
By manufacturing establishments:								
Buffalofish, smoked	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
pounds	657,545	$230,331						
Butterfish, smoked do	549,787	143,867	45,485	$12,091	(1)	(1)		
Chubs, cisco, and tullibees, smoked pounds	2,992,171	960,139	(1)	(1)	(1)	(1)		
Cod, fresh fillets do	2,221,346	326,023						
Eels, smoked do	19,659	7,154	(1)	(1)				
Flounders, fresh fillets pounds	511,080	90,670						
Haddock:								
Fresh fillets do	2,798,689	414,999						
Finnan haddie do	736,400	69,259						
Hake, fresh fillets do	1,425,293	166,936						
Herring, sea:								
Smoked:								
Bloaters do	47,000	8,200						
Kippered do	101,674	20,113						
Miscellaneous pounds			(1)	(1)	236,520	$26,017		
Lake trout, smoked do	66,609	22,502	(1)	(1)	(1)	(1)		
Mackerel, smoked do	133,981	23,386	7,205	1,516	9,000	1,713		
Salmon:								
Smoked do	5,238,792	1,543,823	(1)	(1)	(1)	(1)		
Caviar, canned standard cases	652	13,586						
Shad, smoked pounds	49,405	8,441	(1)	(1)	77,950	19,138		
Sturgeon:								
Smoked do	1,394,067	1,008,728	129,978	86,108	(1)	(1)		
Caviar, canned standard cases	4,630	609,502						
Whitefish:								
Smoked pounds	257,934	64,335	(1)	(1)	108,900	27,365		
Caviar, canned standard cases	267	9,429						
Clams, hard:								
Fresh-shucked gallons					78,927	197,318	(1)	(1)
Cocktail, canned standard cases	700	11,274						
Juice and broth, canned standard cases	1,278	11,910						
Clams, soft, fresh-shucked gallons			20,565	30,849				
Marine-shell products:								
Buttons gross	428,764	310,295	1,145,475	890,240	(1)	(1)		
Novelties		40,546		315,146		(1)		
Oysters, fresh-shucked gallons	295,550	697,287	448,724	795,169	158,612	396,232	77,750	$132,488
Oyster-shell products:								
Poultry feed tons			6,546	67,221	4,009	42,884	(1)	(1)
Lime do			1,648	6,752	1,248	6,259	(1)	(1)
Unclassified products:								
Smoked pounds	(2)	(2)	[3] 680,646	[3] 206,168	[4] 837,100	[4] 273,276		
Canned standard cases	[5] 5,248	[5] 90,093	(2)	(2)				
Miscellaneous		[6] 423,435		[7] 693,151		[8] 560,347		[9] 338,099
Total		7,326,263		3,104,411		1,550,549		470,587

[1] The production of this item is included under unclassified products.
[2] This has been included under miscellaneous.
[3] Includes smoked carp, chubs, cisco, eels, haddock, lake trout, salmon, sea herring, shad, tullibee, and whitefish.
[4] Includes smoked alewives, butterfish, carp, Russian catfish, chubs, haddock, haddock fillets, lake herring, lake trout, salmon, sturgeon, and tullibee.
[5] Includes canned smoked eels and salmon, pickled eels and mussels, imported miscellaneous roe, fish paste, whole hard clams and clam chowder, turtle meat and soup, and terrapin meat and stew.
[6] Includes smoked fillets of cod and haddock, fresh-shucked bay scallops, buttons and lime from freshwater mussel shells, and fish meal.
[7] Includes pickled salmon, canned hard clam chowder, frozen fillets of cod and flounders, menhaden products, and miscellaneous fish scrap and oil.
[8] Includes salted sea herring, marine-shell buttons and novelties, and fish meal.
[9] Includes fresh-shucked hard clams, sturgeon caviar, button blanks from marine shells, menhaden, and oyster-shell products.

NOTE.—The total value of products for the Middle Atlantic States was as follows: By manufacturing establishments, $12,451,810; and by fishermen, $311,704. Some of the above products may have been manufactured from fishery products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting vessels none has been included as fishermen, and among the total persons engaged in the preparation of fishermen's prepared products, 463 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

Industries related to the fisheries of the Middle Atlantic States, 1931—Continued

PRODUCTS MANUFACTURED—Continued

Item	New York		New Jersey		Pennsylvania		Delaware	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By fishermen:								
Eels, smoked ..... pounds			9,800	$3,920				
Whiting, smoked ..... do			600	30				
Clams, soft, fresh-shucked gallons			6,000	6,000				
Scallops, bay, fresh-shucked gallons	98,310	$152,003	62	125				
Scallops, sea, fresh-shucked gallons	100,409	114,015	14,892	18,605				
King crab:								
Scrap, dry ..... tons			506	14,298			44	$508
Meal ..... do							88	2,200
Total		266,018		42,978				2,708
Grand total		7,592,281		3,147,389		1,550,549		473,295

NEW YORK

Fisheries of New York, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets			
	Menhaden	Other		Anchor	Drift	Runaround	Stake
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	88	11	3		11	15	
On boats and shore:							
Regular			210	53	22	37	24
Casual			173	13	185		46
Total	88	11	386	66	218	52	70
Vessels:							
Motor	5	1	1		2	5	
Net tonnage	114	29	12		31	50	
Boats:							
Motor			25	18	21	19	2
Other			134	38	89	2	51
Accessory boats	14	2			5	1	
Apparatus:							
Number	5	1	174	99	252	24	60
Length, yards	1,680	400	16,269				
Square yards				63,552	358,690	59,714	22,699

Item	Lines					Pound nets	Floating traps	Stop nets
	Hand	Trawl	Troll	Trot with baits or snoods	Trot with hooks			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	31	81				7		
On boats and shore:								
Regular	47	83	8	5	2	156	10	5
Casual	8	7			24	9		21
Total	86	171	8	5	26	172	10	26
Vessels:								
Motor	4	13				3		
Net tonnage	99	253				20		
Boats:								
Motor	40	41	4	1		48		
Other	2	14		3	26	135	6	17
Accessory boats		43						
Apparatus:								
Number	176	236	16	4	26	446	6	19
Square yards								8,398
Hooks, baits, or snoods	278	184,400	16	2,800	3,740			

Fisheries of New York, 1931—Continued

OPERATING UNITS: By GEAR—Continued

Item	Fyke nets	Dip nets	Scap nets	Drag nets	Push nets	Otter trawls	Pots		
							Crab	Eel	Lobster
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2					152		4	6
On boats and shore:									
Regular	76	26	4	23	16	77	4	120	175
Casual	49	28	248	3		11		34	17
Total	127	54	252	26	16	240	4	158	198
Vessels:									
Motor	1					47		3	4
Net tonnage	10					614		21	26
Boats:									
Motor	23	1		14		58	2	56	117
Other	89	50	176	3	14			80	3
Apparatus:									
Number	1,845	53	252	22	16	106	36	4,680	17,463
Yards at mouth				64		2,580			

Item	Harpoons	Spears	Dredges					
			Clam	Conch	Crab	Mussel	Oyster	Scallop
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	27		14	2	2	7	217	116
On boats and shore:								
Regular	23	77	10				8	215
Casual	2	61	2					95
Total	52	138	26	2	2	7	225	426
Vessels:								
Steam							1	
Net tonnage							96	
Motor	6		7	1	1	2	47	30
Net tonnage	130		55	7	6	25	935	326
Total vessels	6		7	1	1	2	48	30
Total net tonnage	130		55	7	6	25	1,031	326
Boats:								
Motor	12		8				3	69
Other		100						133
Apparatus:								
Number	18	135	16	2	6	4	102	1,065
Yards at mouth			16	7	5	5	142	752

Item	Tongs	Rakes	Forks	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	68	2			700
On boats and shore:					
Regular	434	353	193	13	1,345
Casual	77	113	112	10	1,071
Total	579	468	305	23	3,116
Vessels:					
Steam					1
Net tonnage					96
Motor	30	2			167
Net tonnage	191	12			2,408
Sail	1				1
Net tonnage	6				6
Total vessels	31	2			169
Total net tonnage	197	12			2,510

Fisheries of New York, 1931—Continued

OPERATING UNITS: By gear—Continued

Item	Tongs	Rakes	Forks	By hand	Total, exclusive of duplication
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	185	199	3		619
Other	250	217	77	1	1,132
Accessory boats					65
Apparatus:					
Number	577	468	320		

CATCH: By gear

Species	Purse seines				Haul seines	
	Menhaden		Other			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					243,683	$2,610
Bluefish					4,480	404
Carp					64,271	6,264
Catfish and bullheads					4,656	802
Eels					12,035	1,257
Flounders					15,325	377
Menhaden	16,160,000	$39,000				
Mullet					6,400	482
Mummichog					65,900	5,362
Scup			414,800	$6,227		
Shad					36,952	3,753
Silversides					114,540	7,352
Squeteague or "sea trout", gray			265,200	13,260	25,465	2,190
Striped bass					28,330	5,036
Suckers					10,907	1,072
Sunfish					107	9
Tomcod					600	30
Whitebait					23,090	1,510
White perch					18,825	1,470
Yellow perch					640	91
Shrimp					84,800	22,325
Total	16,160,000	39,000	680,000	19,487	761,006	62,396

Note.—A recheck of the pound-net fisheries of Suffolk County, New York, shows that changes should be made from the data previously published for this fishery for the years 1929 and 1930. Additions in 1929 should be albacore, 51,625 pounds, valued at $1,032; bonito, 1,259 pounds, valued at $76; butterfish, 545,444 pounds, valued at $47,454; cod, 23,315 pounds, valued at $933; eels, 1,587 pounds, valued at $206; flounders, 30,159 pounds, valued at $1,116; frigate mackerel, 15,395 pounds, valued at $462; sea herring, 12,729 pounds, valued at $280; king whiting, 557 pounds, valued at $78; mackerel, 243,105 pounds, valued at $10,454; pollock, 1,130 pounds, valued at $31; scup or porgy, 84,116 pounds, valued at $4,626; sea bass, 30,549 pounds, valued at $3,360; shad, 3,839 pounds, valued at $790; sharks, 1,505 pounds, valued at $30; spot, 822 pounds, valued at $66; gray squeteague or "sea trout", 60,420 pounds, valued at $5,438; striped bass, 694 pounds, valued at $128; tautog, 3,960 pounds, valued at $217; tuna or "horse mackerel", 4,399 pounds, valued at $527; whiting, 186,229 pounds, valued at $4,655; and squid, 165,752 pounds, valued at $7,624; and deletions in 1929 should be bluefish, 65,429 pounds, valued at $6,543; and menhaden, 26,145 pounds, valued at $131. Additions in 1930 should be bluefish 58,751 pounds, valued at $5,875; bonito, 54,445 pounds, valued at $3,974; butterfish, 365,164 pounds, valued at $28,483; cod, 22,743 pounds, valued at $910; flounders, 32,645 pounds, valued at $1,077; king whiting, 2,192 pounds, valued at $282; mackerel, 109,700 pounds, valued at $5,485; mullet, 140 pounds, valued at $7; pollock, 661 pounds, valued at $18; scup or porgy, 128,740 pounds, valued at $6,437; sea bass, 74,309 pounds, valued at $7,431; sea robin, 1,330 pounds, valued at $27; shad, 1,901 pounds, valued at $380; spot, 140 pounds, valued at $11; gray squeteague or "sea trout", 10,725 pounds, valued at $912; tuna or "horse mackerel", 4,138 pounds, valued at $484; and squid, 214,162 pounds, valued at $8,566, and deletions in 1930 should be albacore, 9,871 pounds, valued at $335; sea herring, 5,150 pounds, valued at $103; menhaden, 80,202 pounds, valued at $320; and striped bass, 4,600 pounds, valued at $718.

Fisheries of New York, 1931—Continued

CATCH: BY GEAR—Continued

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			18,877	$381			1,125	$60
Bluefish	44,825	$4,657			104,415	$10,275	2,265	294
Butterfish					28,400	1,950		
Carp	6,380	723	1,866	187			300	45
Catfish and bullheads			22	3				
Eels	50	5					300	45
Flounders			300	9				
King whiting or "kingfish"	1,050	88			4,200	333	350	28
Mackerel			64,365	4,440				
Menhaden					1,600	25		
Mullet	2,000	160						
Pike or pickerel			400	40				
Shad			303,563	36,546			3,231	1,065
Smelt	500	175						
Spot								
Squeteague or "sea trout," gray	62,094	5,573	200	14	62,770	5,066	16,285	1,456
Striped bass	255	56	50	8	2,000	440	3,114	634
Sturgeon	900	215	890	220			100	22
Suckers	222	32	1,810	182			90	4
White perch	5,581	820	1,108	111			1,565	118
Total	123,857	12,504	393,451	42,141	203,385	18,089	28,725	3,771

Species	Lines									
	Hand		Trawl		Trot with baits or snoods		Trot with hooks		Troll	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	320,184	$19,192							8,500	$680
Carp							1,795	$212		
Catfish and bullheads							213	40		
Cod	81,660	1,801	904,420	$23,853						
Eels			350	35	2,000	$240	7,326	997		
Flounders	24,700	382	400	24						
Grayfish			100	3						
Haddock	8,250	210	23,400	647						
Hake			21,710	705						
Mackerel	4,320	130								
Pollock	42,010	840	300	15						
Scup	18,315	422								
Sea bass	110,090	6,004								
Shad			100	10						
Skates			6,200	61						
Squeteague or "sea trout", gray	100	8	15,250	1,220						
Suckers							300	36		
Tautog	17,200	895								
Tilefish			1,021,120	30,362						
White perch							100	15		
Crabs:										
Hard					25,585	1,210				
Soft					1,012	202				
Total	626,829	29,884	1,993,350	56,935	28,597	1,652	9,734	1,300	8,500	680

Fisheries of New York, 1931—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Floating traps		Stop nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	298,200	$2,450			700	$22	135,169	$1,105
Bluefish	185,303	15,264						
Bonito	446,915	20,217	68	$2				
Butterfish	2,113,642	101,167	63,759	1,907				
Carp					37,079	3,404	7,450	639
Catfish and bullheads					470	72	7,786	1,333
Cod	15,634	414	565	12				
Eels	189,412	19,051			5	1	5,200	632
Flounders	474,095	28,484	168,450	8,928			634,997	11,083
Frigate mackerel	4,365	86						
Goosefish	822	8						
Grayfish	1,096	33						
Hake			577	9				
Herring, sea	43,556	722	3,335	7				
Kingfish or "king mackerel"	13,314	894	145	9				
King whiting or "kingfish"	79,313	5,543						
Mackerel	253,893	9,966						
Menhaden	23,064	182						
Mullet	11,662	555						
Mummichog							17,850	150
Pike or pickerel							145	31
Pollock	5,126	93	5,024	84				
Scup	614,812	17,963	51,821	622				
Sea bass	73,303	5,385	42,844	2,871				
Sea robin	29,296	587	4,083	6				
Shad	13,060	1,490	127	7				
Sharks	1,022	21						
Skates	672	9	8,075	68				
Spot	66,779	3,183						
Squeteague or "sea trout," gray	1,016,287	79,866	392	33				
Striped bass	10,182	1,778			270	61	231	50
Sturgeon	46	12			100	50		
Suckers					830	60	10,724	1,098
Sunfish					123	7	1,692	162
Tautog	47,654	2,766	683	37			300	15
Tomcod							61,593	1,933
Tuna or "horse mackerel"	18,320	733						
White perch	100	23			200	20	3,403	306
Whiting	326,235	3,653	75	1				
Yellow perch							2,368	302
Crabs, hard	4,896	408					24,300	810
Squid	1,338,274	25,258	20,488	307				
Total	7,720,350	348,264	370,511	14,910	39,777	3,697	913,208	19,649

Species	Dip nets		Scap nets		Drag nets		Push nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			92,286	$3,204				
Carp			50,840	5,091				
Catfish and bullheads			2,670	350				
Eels			310	48				
Flounders			6	1				
Mummichog					60	$6		
Pike or pickerel			105	17				
Shad			5	1				
Silversides					70	7		
Smelt			269	41				
Striped bass			6	1				
Suckers			10,734	1,006				
Sunfish			330	30				
White perch			1,043	123				
Yellow perch			80	10				
Crabs:								
Hard	17,140	$1,267			22,500	738		
Soft	4,115	1,015						
Shrimp	2,950	1,475			71,600	17,991		
Scallops, bay							14,750	$1,475
Total	24,205	3,757	158,684	9,923	94,230	18,742	14,750	1,475

Fisheries of New York, 1931—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls		Pots					
			Crab		Eel		Lobster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	1,230	$41						
Butterfish	10,070	760						
Catfish and bullheads					50	$5		
Cod	463,240	12,067						
Croaker	42,384	975						
Eels	231	10			234,605	25,217		
Flounders	5,876,637	226,126						
Haddock	1,378,935	29,278						
Hake	37,115	660						
Halibut	1,640	220						
Kingfish or "king mackerel"	504	25						
King whiting or "kingfish"	2,560	155						
Mullet	233	6						
Mummichog					17,930	2,523		
Pollock	1,395	23						
Scup	237,234	5,397						
Sea bass	17,050	853					37,417	$892
Squeteague or "sea trout," gray	2,773	76						
Striped bass	19,883	250						
Tautog	35	1						
Whiting	55	2						
Yellow perch					200	30		
Crabs, hard			4,200	$420			3,700	131
Lobsters	8,866	2,217					474,980	119,670
Squid	12,664	206						
Clams, surf or skimmer	240	13						
Conchs	3,600	150						
Total	8,118,574	279,511	4,200	420	252,785	27,775	516,097	120,693

Species	Harpoons		Spears		Dredges			
					Clam		Conch	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			46,054	$5,185				
Sea bass			5,000	100				
Swordfish	106,132	$22,717						
Clams, surf or skimmers					296,160	$15,417		
Conchs							6,570	$548
Total	106,132	22,717	51,054	5,285	296,160	15,417	6,570	548

Species	Dredges—Continued							
	Crab		Mussel		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard	2,200	$44						
Clams, hard, private					800	$225		
Conchs							45,000	$1,800
Mussels			160,000	$7,900				
Oysters:								
Market, public, fall					1,400	250		
Market, private, spring					2,815,279	433,691		
Market, private, fall					3,579,304	545,315		
Seed, private, spring					203,586	29,448		
Seed, private, fall					12,238	2,529		
Scallops:								
Bay							1,026,106	105,270
Sea							1,097,868	87,619
Total	2,200	44	160,000	7,900	6,612,607	1,011,458	2,168,974	194,689

Fisheries of New York, 1931—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Forks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	709,000	$235,971	370,712	$113,496	28,380	$5,932	840	$262
Hard, private	154,048	50,425			1,000	200		
Razor					1,200	240		
Soft, public			123,570	13,665	200,145	24,963		
Soft, private					6,300	840		
Surf or skimmers	19,584	2,448						
Mussels	1,600	53					8,000	200
Oysters:								
Market, public, spring	45,430	6,504					56	8
Market, public, fall	141,718	23,076	105	15				
Market, private, spring	40,236	8,272						
Market, private, fall	50,402	8,357						
Seed, public, spring	269,822	28,176	2,324	259			2,100	225
Seed, public, fall	119,035	10,285	1,652	179			5,446	622
Scallops, bay			1,000	100				
Bloodworms					17,982	22,553		
Sandworms					23,544	22,083		
Total	1,550,875	373,567	499,363	127,714	278,551	76,811	16,442	1,317

OPERATING UNITS: BY COUNTIES

Item	Albany	Bronx	Columbia	Dutchess	Greene	Kings	Nassau	New York	Orange
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						140	51	142	
On boats and shore:									
Regular		1	2	5	3	165	212		2
Casual	11	1	63	135	32	70	112		31
Total	11	2	65	140	35	375	375	142	33
Vessels:									
Motor						31	14	17	
Net tonnage						399	193	457	
Boats:									
Motor				7		82	33		2
Other	10	2	46	69	26	7	205		23
Accessory boats						21	1	35	
Apparatus:									
Purse seines:									
Menhaden								2	
Length, yards								700	
Other						1			
Length, yards						400			
Haul seines			10	5	6	5	16		4
Length, yards			1,303	656	527	75	1,223		499
Gill nets:									
Drift			3	31	3		5	140	7
Square yards			9,556	95,458	2,628		8,615	25,200	21,927
Runaround							16		
Square yards							32,864		
Lines:									
Hand						46		18	
Hooks						82		24	
Trawl						97	16	25	
Hooks						92,400	31,200	16,150	
Trot with hooks				5			4		6
Hooks				1,090			200		750
Troll						16			
Hooks						16			
Pound nets							4		
Stop nets			2		6				1
Square yards			615		3,906				4 0
Fyke nets	16		35	39	15				15
Dip nets							29		
Scap nets	9		34	75	20				14
Drag nets							5		
Yards at mouth							7		
Otter trawls						28	5	5	
Yards at mouth						544	121	138	

Fisheries of New York, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Albany	Bronx	Columbia	Dutchess	Greene	Kings	Nassau	New York	Orange
Apparatus—Continued									
Pots:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Crab						36			
Eel			2	3		120	453		16
Lobster						7,350	3,180		
Harpoons						1		1	
Spears						15	65		
Dredges:									
Clam						15			
Yards at mouth						15			
Mussel							2		
Yards at mouth							2		
Oyster							16	14	
Yards at mouth							19	21	
Scallop						30	8	2	
Yards at mouth						81	21	5	
Tongs							155		
Rakes		2					60		
Forks						62	124		

Item	Putnam	Queens	Rensselaer	Richmond	Rockland	Suffolk	Ulster	Westchester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		2		2		358		5
On boats and shore:								
Regular				8	3	928	8	8
Casual	2	2	18	6	42	320	182	44
Total	2	4	18	16	45	1,606	190	57
Vessels:								
Steam						1		
Net tonnage						96		
Motor		1		1		101		2
Net tonnage		16		7		1,313		23
Sail						1		
Net tonnage						6		
Total vessels		1		1		103		2
Total net tonnage		16		7		1,415		23
Boats:								
Motor				9		477	6	3
Other	2	1	15		28	550	119	29
Accessory boats						8		
Apparatus:								
Purse seines:								
Menhaden						3		
Length, yards						980		
Haul seines		1	4	1	4	105	7	6
Length, yards		133	498	5	691	9,090	869	700
Gill nets:								
Anchor						89	5	5
Square yards						61,970	1,085	497
Drift					5		49	9
Square yards					18,028		149,587	27,691
Runaround						8		
Square yards						26,850		
Stake					12	39		9
Square yards					4,456	9,480		8,763
Lines:								
Hand						112		
Hooks						172		
Trawl						98		
Hooks						44,650		
Trot with baits or snoods						4		
Baits or snoods						2,800		
Trot with hooks					6		4	1
Hooks					800		600	300

Fisheries of New York, 1931—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Putnam	Queens	Rensselaer	Richmond	Rockland	Suffolk	Ulster	Westchester
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Pound nets						442		
Floating traps						6		
Stop nets	1				1		7	1
Square yards	99				66		3,062	250
Fyke nets			4		3	1,613	71	34
Dip nets						24		
Scap nets	1		9		1		87	2
Drag nets						17		
Yards at mouth						57		
Push nets						16		
Otter trawls		1		1		65		1
Yards at mouth		30		17		1,705		25
Pots:								
Eel	3				93	3,946	13	31
Lobster				1,300		5,633		
Harpoons						15		1
Spears						54		1
Dredges:								
Clam				1				
Yards at mouth				1				
Conch				2				
Yards at mouth				7				
Crab						6		
Yards at mouth						5		
Mussel						2		
Yards at mouth						3		
Oyster						72		
Yards at mouth						102		
Scallop						1,025		
Yards at mouth						645		
Tongs						419		3
Rakes						405		1
Forks				4		130		

CATCH: BY COUNTIES

Species	Albany		Bronx		Columbia		Dutchess		Greene	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	2,100	$67			45,135	$1,275	34,186	$1,075	20,750	$449
Carp	2,970	216			16,523	1,558	14,948	1,538	31,206	2,654
Catfish and bullheads	405	38			2,855	555	2,445	422	1,360	193
Eels	20	2			545	109	1,298	138	120	11
Flounders							6	1		
Pike or pickerel	34	7					25	3		
Shad					5,630	581	97,720	12,039	1,031	128
Striped bass							155	30		
Sturgeon							800	200		
Suckers	3,370	300			4,067	366	2,649	273	1,825	156
Sunfish					114	9	879	77	50	3
Tomcod							21	2	600	30
White perch	15	3			50	5	508	54	30	3
Yellow perch	15	1			833	143	829	79	41	4
Clams: Hard, public			1,200	$450						
Total	8,929	634	1,200	450	75,752	4,601	156,469	15,931	57,013	3,631

Fisheries of New York, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Kings		Nassau		New York		Orange	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							2,755	$134
Bluefish	145,000	$9,257	52,190	$5,077	165,000	$9,000		
Butterfish	20	1	13,400	750	170	14		
Carp							11,693	1,243
Catfish and bullheads							895	152
Cod	562,035	14,354	184,530	4,482	336,860	9,579		
Croaker	42,160	969						
Eels	10,581	1,045	50,749	5,565	350	35	1,085	213
Flounders	730,991	23,026	240,250	10,960	376,935	14,283		
Haddock	68,650	1,712			1,079,535	23,380		
Hake	28,815	550			10,300	150		
Halibut					1,640	220		
King whiting or "kingfish"			4,800	375				
Mackerel			17,860	714	46,505	3,726		
Menhaden					7,200,000	18,000		
Mullet	180	4	1,000	50				
Mummichog	29,400	3,224	17,190	2,445				
Pollock					1,395	23		
Scup	593,579	10,406	5,800	116	30,060	600		
Sea bass	52,100	1,535	35,275	747	1,250	70		
Shad							17,016	2,672
Silversides	1,100	90	16,960	1,741				
Squeteagues or "sea trout", gray	267,920	13,334	32,260	2,449				
Striped bass	19,883	250	4,530	946				
Suckers							7,340	775
Swordfish	28,128	7,882			33,981	8,494		
Tautog	16,535	826			700	70		
Tilefish	259,870	8,425			761,250	21,937		
Tomcod							50	18
White perch							500	75
Whiting	55	2						
Crabs:								
Hard	4,200	420	4,030	179				
Soft			2,075	581				
Lobsters	259,750	56,483	79,820	23,780				
Shrimp			1,900	566				
Squid	1,357	26						
Clams:								
Hard, public			198,740	69,880				
Hard, private			1,000	200				
Razor			1,200	240				
Soft, public	18,000	1,200	59,625	9,060				
Soft, private			6,300	840				
Surf or skimmers	268,320	13,909	19,584	2,448				
Conchs	48,600	1,950						
Mussels	8,000	200	100,000	5,500				
Oysters:								
Market, private, spring			220,493	49,130	461,251	69,764		
Market, private, fall			243,357	48,024	473,480	72,746		
Seed, public, spring			2,324	259				
Seed, public, fall			1,162	125				
Scallops:								
Bay	456	28						
Sea	522,054	43,355	285,864	23,827	59,700	4,875		
Bloodworms	7,245	7,245	10,647	15,214				
Sandworms	9,700	9,700	1,743	1,736				
Total	4,004,684	231,408	1,916,658	288,006	11,040,362	256,966	41,334	5,282

Species	Putnam		Queens		Rensselaer		Richmond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	600	$15			11,734	$207		
Carp	515	55	300	$30	14,266	1,306		
Catfish and bullheads					3,902	658		
Eels	125	13			7	1		
Flounders			186,623	7,465			33,423	$1,170
Mummichog							1,000	200
Pike or pickerel					6	1		
Sea bass			1,150	80				
Shad					95	19		
Suckers	50	5			1,154	82		
White perch	200	20			400	40		
Yellow perch					17	3		
Crabs: Hard							3,700	131
Lobsters			150	38			23,600	5,900
Clams: Surf or skimmers							28,080	1,521
Conchs							6,570	548
Sandworms							250	250
Total	1,490	108	188,223	7,613	31,581	2,317	96,623	9,720

Fisheries of New York, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Rockland		Suffolk		Ulster		Westchester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	925	$45	644,295	$5,330	27,125	$1,203	435	$32
Bluefish			309,012	27,473				
Bonito			446,983	20,219				
Butterfish			2,202,281	105,019				
Carp	6,600	605	9,600	995	48,893	5,095	12,467	1,270
Catfish and bullheads	293	50			2,335	350	1,377	187
Cod			382,094	9,732				
Croaker			224	6				
Eels	22,061	1,362	401,530	43,069	1,467	241	7,940	919
Flounders			5,562,182	216,697			64,500	1,812
Frigate mackerel			4,365	86				
Goosefish			822	8				
Grayfish			1,196	36				
Haddock			262,400	5,043				
Hake			20,287	674				
Herring, sea			46,891	729				
Kingfish or "king mackerel"			13,963	928				
King whiting or "kingfish"			82,673	5,772				
Mackerel			258,213	10,096				
Menhaden			8,984,664	21,207				
Mullet			19,115	1,149				
Mummichog			54,150	2,172				
Pike or pickerel					40	6	545	71
Pollock			52,460	1,032				
Scup			707,543	19,509				
Sea bass			195,929	13,673				
Sea robin			33,379	593				
Shad	12,226	2,399	14,337	2,032	158,433	17,275	50,550	5,727
Sharks			1,022	21				
Silversides			96,550	5,528				
Skates			14,947	138				
Smelt			500	175	269	41		
Spot			66,779	3,183				
Squeteagues or "sea trout", gray			1,166,636	92,979				
Striped bass	3,134	649	34,732	6,043	100	25	1,787	371
Sturgeon	100	22	646	162	240	55	250	80
Suckers	1,166	109			8,478	841	5,518	583
Sunfish					1,209	119		
Swordfish			37,411	5,191			6,612	1,150
Tautog			48,637	2,818				
Tomcod			61,258	1,902	264	11		
Tuna or "horse mackerel"			18,320	733				
Whitebait			23,090	1,510				
White perch	1,065	82	22,425	2,125	1,762	175	4,970	424
Whiting			326,310	3,654				
Yellow perch	770	111			783	92		
Crabs:								
Hard			92,591	4,298				
Soft			3,052	636				
Lobsters			120,526	35,686				
Shrimp			157,450	41,225				
Squid			1,370,069	25,745				
Clams:								
Hard, public			901,992	283,141			7,000	2,190
Hard, private			154,848	50,650				
Soft, public			246,090	28,368				
Mussels			61,600	2,453				
Oysters:								
Market, public, spring			45,486	6,512				
Market, public, fall			143,223	23,341				
Market, private, spring			2,173,771	323,069				
Market, private, fall			2,912,869	432,902				
Seed, public, spring			271,922	28,401				
Seed, public, fall			124,971	10,961				
Seed, private, spring			203,586	29,448				
Seed, private, fall			12,238	2,529				
Scallops:								
Bay			1,041,400	106,817				
Sea			230,250	15,562				
Bloodworms			90	94				
Sandworms			11,851	10,397				
Total	48,340	5,434	32,909,726	2,101,676	251,398	25,529	163,951	14,816

NEW JERSEY

Fisheries of New Jersey, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets				Lines	
	Menhaden	Other		Anchor	Drift	Run-around	Stake	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	27	143			11			65	63
On boats and shore:									
Regular			87	1	115	108	51	262	298
Casual			185	1	187	13	50	97	65
Total	27	143	272	2	313	121	101	424	426
Vessels:									
Motor	2	16			2			12	12
Net tonnage	99	246			27			172	170
Boats:									
Motor			12	1	127	58	40	222	264
Other			94		42		18	8	
Accessory boats	2	17	8	7	2			24	15
Apparatus:									
Number	2	16	114	1	1,076	87	942	928	836
Length, yards	806	6,100	12,166						
Square yards				900	719,060	254,195	118,010		
Hooks, baits, or snoods								1,185	504,550

Item	Trot lines with baits or snoods	Pound nets	Weirs	Stop nets	Fyke nets	Dip nets	Cast nets	Drag nets	Otter trawls
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		262							137
On boats and shore:									
Regular	3	132		29	75	13	2	10	56
Casual	2	6	25	55	41	37	5	5	
Total	5	400	25	84	116	50	7	15	193
Vessels:									
Motor		39							33
Net tonnage		237							663
Boats:									
Motor	2	20	6	17	33	11		9	25
Other	1	22	13	30	40	7	3		
Accessory boats				4	2				
Apparatus:									
Number	3	186	109	61	1,324	50	4	16	58
Square yards								37	
Yards at mouth				69,300					1,332
Hooks, baits, or snoods	625								

Fisheries of New Jersey, 1931—Continued

OPERATING UNITS: By GEAR—Continued

Item	Wire baskets	Pots			Spears	Dredges			
		Crab	Eel	Lobster		Clam	Crab	Oyster	Scallop
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						48	14	2,399	8
On boats and shore:									
Regular		3	80	244	42	6		35	
Casual	1		28	11	42	5		1	
Total	1	3	108	255	84	59	14	2,435	8
Vessels:									
Motor						11	6	166	2
Net tonnage						119	54	2,873	16
Sail								61	
Net tonnage								1,591	
Total vessels						11	6	227	2
Total net tonnage						119	54	4,464	16
Boats:									
Motor		1	46	143	14	6		22	
Other			33		66				
Accessory boats					1				
Apparatus:									
Number	4	25	3,690	30,678	84	32	38	495	4
Yards at mouth						31	50	583	11

Item	Tongs	Rakes	Forks	Hoes	Gaffs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							3,021
On boats and shore:							
Regular	418	305	12	104	3	44	1,389
Casual	429	268	33	88	2	63	1,266
Total	847	573	45	192	5	107	5,676
Vessels:							
Motor							274
Net tonnage							4,257
Sail							61
Net tonnage							1,591
Total vessels							335
Total net tonnage							5,848
Boats:							
Motor	454	324		30			1,178
Other	336	211	1	62	3	10	673
Accessory boats	21	4					101
Apparatus:							
Number	847	573	45	192	5		

Fisheries of New Jersey, 1931—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines	
	Menhaden		Other			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					109,900	$2,143
Bluefish			296,969	$15,113	4,800	507
Bonito			2,077	87		
Butterfish			72,755	2,018		
Carp					50,640	6,246
Catfish and bullheads					29,653	1,603
Cod			13,500	150		
Croaker			88,060	1,249	7,050	270
Eels					48,957	4,764
Flounders			2,695	79	27,110	1,841
Hake			65	1		
Herring, sea					1,000	20
King whiting or "kingfish"					1,710	172
Menhaden	3,506,300	$11,699	2,997,101	8,974	200	6
Mullet			10,200	281	41,004	1,380
Mummichog					5,857	460
Pilotfish			115	1		
Scup or porgy			1,255,531	14,841		
Sea bass			18,489	354		
Shad					17,216	4,403
Silversides					5,604	672
Skates			800	7		
Spot					7,100	614
Squeteagues or "sea trout", gray			3,758,007	73,094	45,804	4,218
Striped bass					12,760	2,808
Suckers					66,095	5,651
Thimble-eyed mackerel					8,000	240
Tomcod					20	1
White perch					29,865	2,881
Yellow perch					9,000	720
Squid			33,385	397		
Total	3,506,300	11,699	8,549,749	116,646	529,345	41,620

Species	Gill nets								Lines—Hand	
	Anchor		Drift		Run-around		Stake			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							86,350	$1,742		
Bluefish	900	$72	31,020	$2,129	231,640	$19,695	30,447	2,464	1,375,368	$96,346
Bonito			9,225	368					65,018	3,251
Butterfish			16,975	708						
Catfish and bullheads									300	30
Cero									2,000	80
Cod									42,800	856
Croaker			13,000	390			1,450	60	11,578	595
Eels			27,000	2,700					5,960	512
Flounders					113	8	1,000	60	57,428	4,140
Herring, sea					270	8				
Kingfish or "king mackerel"									45,000	1,350
King whiting or "kingfish"							500	75	500	50
Mackerel			180,357	7,717						
Menhaden	100	2			1,720	37				
Scup or porgy									24,040	481
Sea bass									543,545	23,727
Shad			107,560	17,260			73,203	9,132		
Snapper, red									3,500	320
Spanish mackerel									11,000	475
Spot			22,600	916	6,450	258	2,000	120		
Squeteagues or "sea trout", gray	100	6	138,097	5,521	176,488	9,825	25,308	1,725	49,068	3,387
Striped bass							745	140		
Tautog									31,500	780
White perch							44,570	5,501	200	16
Yellow perch									200	16
Crabs, hard							360	41		
Total	1,100	80	545,834	37,709	416,681	29,831	265,933	21,060	2,269,005	136,412

Fisheries of New Jersey, 1931—Continued

CATCH: BY GEAR—Continued

Species	Lines—Continued				Pound nets		Weirs	
	Trawl		Trot with baits or snoods					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish					558,894	$40,256		
Bonito					208,322	10,377		
Butterfish					4,216,672	201,762		
Cod	5,737,453	$144,936			248,309	9,159		
Croaker					142,896	5,592		
Cusk					4,400	132		
Drum, red or redfish					4,300	43		
Eels	148	2	1,200	$132	6,400	549		
Flounders	9,450	761			444,052	26,257		
Goosefish					4,200	53		
Grayfish					3,600	54		
Hake	16,750	188			126,671	1,840		
Herring:								
Round					56,910	4,268		
Sea					395,186	3,499		
King whiting or "kingfish"					50,122	4,089		
Mackerel					55,475	3,377		
Menhaden					3,595,842	28,380		
Mullet					1,500	46		
Pollock					1,088	53		
Scup or porgy					3,628,469	70,650		
Sea bass					593,469	20,172		
Sea robin					70,018	640		
Shad					56,228	9,602		
Sharks					29,780	594		
Skates	130	1			68,020	414		
Spanish mackerel					223,604	33,541		
Spot					147,803	4,370		
Squeteagues or "sea trout", gray					7,149,354	256,691		
Striped bass					789	159		
Sturgeon					920	115		
Tautog	23	2			17,871	476		
Thimble-eyed mackerel					98,452	2,689		
Tuna or horse mackerel					1,830	100		
White perch					1,230	49		
Whiting					2,404,403	23,275		
Yellow perch					63,658	637		
Crabs:								
Hard			4,160	280				
King					2,880,716	6,285	1,539,999	$3,548
Soft			752	282				
Squid					774,299	22,536		
Turtles, loggerhead					225	2		
Total	5,763,954	145,890	6,112	694	28,330,977	792,783	1,539,999	3,548

Species	Stop nets		Fyke nets		Dip nets		Cast nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			193,900	$3,814				
Carp	90,150	$12,006					2,750	$315
Catfish and bullheads	50	4	13,202	885				
Eels			48,856	5,074				
Flounders			72,138	3,783				
Shad	2,493	807						
Spot			50	2				
Squeteagues or "sea trout", gray			2,275	177				
Striped bass			4,085	831				
Tomcod			25	1				
White perch			198,403	23,717				
Yellow perch			48,267	3,501				
Crabs:								
Hard					11,542	$1,132		
Soft					15,600	4,985		
Turtles, snapper			1,800	180				
Total	92,693	12,817	583,001	41,965	27,142	6,117	2,750	315

Fisheries of New Jersey, 1931—Continued

CATCH: BY GEAR—Continued

Species	Drag nets		Otter trawls		Wire baskets		Pots			
							Crab		Eel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			4,873	$300						
Butterfish			14,103	655						
Cod			179,185	4,954						
Croaker			1,266,641	47,220						
Drum, red or redfish			560	21						
Eels			1,075	87					270,726	$24,154
Flounders			2,722,735	98,111					7,500	750
Haddock			10,208	173						
Hake			39,421	703						
Herring, sea			2,940	59						
King whiting or "king-fish"			7,016	420						
Mackerel			110	7						
Mummichog									3,600	414
Pigfish			3,635	95						
Pollock			309	12						
Scup or porgy			2,431,430	59,474						
Sea bass			1,163,104	44,286						
Shad			263	114						
Skates			574	11						
Spot			18,532	383						
Squeteagues or "sea trout", gray			340,935	10,144						
Sturgeon			8,179	1,252						
Tautog			6,928	142						
White perch			4,464	126						
Whiting			3,110	62						
Crabs:										
Hard					34	$2	10,000	$500		
Soft							3,600	1,350		
Lobsters			3,171	620						
Shrimp	5,560	$2,780	175,000	3,875						
Squid			14,412	327						
Total	5,560	2,780	8,332,913	273,633	34	2	13,600	1,850	281,826	25,318

Species	Pots—Lobster		Spears		Dredges			
					Clam		Crab	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels			155,200	$17,445				
Sea bass	1,379,350	$54,106						
Tautog	18,960	605						
Crabs, hard	1,445	91					125,727	$6,744
Lobsters	650,463	167,067						
Clams:								
Hard, public					32,324	$7,126		
Hard, private					17,610	2,915		
Surf or skimmers					181,250	10,100		
Total	2,050,218	221,869	155,200	17,445	231,184	20,141	125,727	6,744

Species	Dredges—Continued				Tongs		Rakes	
	Oyster		Scallop					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard					1,600	$130	14,400	$1,080
Clams:								
Hard, public					730,337	178,807	492,538	116,564
Hard, private	7,560	$1,858			1,129	581	10,317	2,681
Mussels					100	1		
Oysters:								
Market, public, spring					53,867	8,201	15,400	2,484
Market, public, fall					86,562	11,025	3,755	690
Market, private, spring	297,834	59,027			90,027	19,870	21,104	5,484
Market, private, fall	13,682,072	1,544,276			118,372	27,236	21,988	5,732
Seed, public, spring	11,286,925	1,693,560			185,269	13,145	32,176	2,510
Seed, public, fall					78,410	5,392	2,250	190
Seed, private spring	410,215	36,880			15,360	1,200	16,313	1,271
Seed, private, fall	52,727	5,135			11,533	906	13,163	1,026
Scallops:								
Bay							564	63
Sea			154,364	$13,546				
Total	25,737,333	3,340,736	154,364	13,546	1,372,566	266,494	643,968	139,775

Fisheries of New Jersey, 1931—Continued

CATCH: BY GEAR—Continued

Species	Forks		Hoes		Gaffs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public							64,064	$15,830
Soft, public	1,000	$75	1,217,900	$95,781				
Mussels							4,000	280
Oysters:								
Market, public, spring							340	86
Market, public, fall							1,907	457
Market, private, fall							8,689	1,800
Seed, public, spring							1,478	110
Scallops, bay							112	12
Terrapin, diamond-back							173	61
Turtles:								
Loggerhead					10	$1		
Snapper					735	150		
Bloodworms	2,621	2,405						
Sandworms	7,436	7,675						
Total	11,057	10,155	1,217,900	95,781	745	151	80,763	18,636

OPERATING UNITS: BY COUNTIES

Item	Atlantic	Bergen	Burlington	Cape May	Cumberland	Gloucester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	83			353	2,359	7
On boats and shore:						
Regular	258	5	53	239	32	2
Casual	167	21	73	281	201	24
Total	508	26	126	873	2,592	33
Vessels:						
Motor	18			58	157	1
Net tonnage	241			893	2,796	10
Sail					60	
Net tonnage					1,574	
Total vessels	18			58	217	1
Total net tonnage	241			893	4,370	10
Boats:						
Motor	196	3	62	238	51	8
Other	114	9	24	155	141	7
Accessory boats		23		46	12	2
Apparatus:						
Purse seines:						
Menhaden	1			1		
Length, yards	350			456		
Other	3			12		
Length, yards	1,090			4,610		
Haul seines	27		20	15	9	2
Length, yards	2,379		1,905	874	900	200
Gill nets:						
Drift	155		17	429	78	6
Square yards	44,780		26,420	192,308	69,212	5,560
Runaround				5		
Square yards				3,300		
Stake	61	4		5	45	
Square yards	7,956	7,000		800	5,247	
Lines:						
Hand	59			474	24	
Hooks	88			622	42	
Trawl	175			358	8	
Hooks	95,200			255,500	4,800	
Trot with baits or snoods					1	
Baits or snoods					325	
Pound nets	2			101		
Weirs				83	26	
Stop nets			6		12	6
Square yards			5,550		9,400	31,200
Fyke nets	20		135	34	135	
Dip nets	27			4	3	
Otter trawls	23			33	1	
Yards at mouth	560			674	28	
Wire baskets				4		
Pots:						
Eel		172		169	20	
Lobster	75			448		
Spears	12			3		

Fisheries of New Jersey, 1931—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Atlantic	Bergen	Burlington	Cape May	Cumberland	Gloucester
Apparatus—Continued						
Dredges:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Clam	2			5	5	
Yards at mouth	2			4	5	
Oyster	13		13		432	2
Yards at mouth	15		13		517	2
Tongs	294		54	139	130	
Rakes	219		18	126		
Hoes	2					
Gaffs				1	4	

Item	Hunterdon	Mercer	Middlesex	Monmouth	Ocean	Salem
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			3	40	166	10
On boats and shore:						
Regular			15	464	303	18
Casual	32	10	21	159	189	88
Total	32	10	39	663	658	116
Vessels:						
Motor			2	10	28	
Net tonnage			14	119	184	
Sail						1
Net tonnage						17
Total vessels			2	10	28	1
Total net tonnage			14	119	184	17
Boats:						
Motor			7	237	330	46
Other	8	6	4	133	56	16
Accessory boats	2			12	3	1
Apparatus:						
Purse seines:						
Other than menhaden				1		
Length, yards				400		
Haul seines	6	2	14	1	10	8
Length, yards	1,445	350	545	100	2,478	990
Gill nets:						
Anchor				1		
Square yards				900		
Drift				350		41
Square yards				133,200		247,580
Runaround			7	50	25	
Square yards			9,735	130,360	110,800	
Stake			5		822	
Square yards			1,200		95,807	
Lines:						
Hand			4	211	156	
Hooks			8	247	178	
Trawl				150	145	
Hooks				75,000	74,050	
Trot with baits or snoods				1		1
Baits or snoods				100		200
Pound nets				40	43	
Stop nets						37
Square yards						23,150
Fyke nets		30		110	680	180
Dip nets				9	7	
Cast nets						4
Drag nets					16	
Yards at mouth					37	
Otter trawls				1		
Yards at mouth				70		
Pots:						
Crab						25
Eel			198	1,350	1,781	
Lobster			400	19,945	9,770	
Spears				60	9	
Dredges:						
Clam			6	14		
Yards at mouth			7	13		
Crab			8	30		
Yards at mouth			8	42		
Oyster					33	2
Yards at mouth					34	2
Scallop				4		
Yards at mouth				11		
Tongs				2	228	
Rakes				70	140	
Forks			12	33		
Hoes				190		

Fisheries of New Jersey, 1931—Continued

CATCH: BY COUNTIES

Species	Atlantic		Bergen		Burlington		Cape May	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,700	$41			18,800	$470		
Bluefish	123,940	8,045					1,098,609	$62,162
Bonito							10,876	537
Butterfish	5,610	269					1,984,678	81,520
Carp					22,080	3,314		
Catfish and bullheads	21,657	847			5,500	405		
Cero							2,000	80
Cod	1,822,757	46,535					2,947,551	63,840
Croaker	10,703	458					1,411,608	50,463
Drum, red or redfish							4,860	64
Eels	69,977	7,022	25,500	$1,530	12,300	1,225	31,199	2,921
Flounders	1,282,342	41,716					1,599,022	64,260
Haddock							10,208	173
Hake							41,789	746
Herring, sea	12,670	190					28,818	338
Kingfish or "king mackerel"							45,000	1,350
King whiting or "kingfish"	3,420	284					20,987	1,474
Mackerel	18,357	1,080					55,240	2,589
Menhaden	6,500	33					6,526,620	20,834
Mullet							21,200	501
Mummichog	2,857	100						
Pigfish							3,635	95
Pilotfish							115	1
Pollock							309	12
Scup or porgy	169,184	1,786					4,804,175	101,901
Sea bass	438,306	13,288					1,555,894	66,337
Sea robin							8,552	25
Shad			72,000	8,941	3,593	647	3,702	352
Sharks							3,240	55
Skates	574	11					16,650	131
Snapper, red							3,500	320
Spanish mackerel							24,941	2,567
Spot	6,550	262					72,739	2,756
Squeteagues or "sea trout", gray	1,083,955	16,297					6,297,336	188,179
Striped bass	7,265	1,763						
Sturgeon							9,099	1,367
Sucker	400	12			29,695	2,589		
Tautog	1,533	46					59,448	1,374
Thimble-eyed mackerel							20,730	357
White perch	32,173	3,658					4,464	126
Whiting							73,238	933
Crabs:								
Hard	3,400	360					19,354	1,403
King							4,054,048	9,033
Lobsters	1,239	251					2,451	509
Shrimp							175,000	3,875
Squid	1,300	52					212,232	5,850
Clams:								
Hard, public	345,392	84,451			93,083	22,856	327,552	79,853
Hard, private					4,638	1,140		
Soft, public	12,000	1,800						
Surf or skimmer	75,000	3,500					63,750	3,200
Mussels							4,100	281
Oysters:								
Market, public, spring	1,275	275			8,288	1,950	3,825	676
Market, public, fall	8,075	2,100			8,288	1,950	5,561	1,110
Market, private, spring	132,397	27,869			89,004	19,692	425	100
Market, private, fall	155,840	34,268			88,986	19,688	11,239	2,400
Seed, public, spring	38,138	2,919			38,823	3,020	11,700	910
Seed, public, fall	900	70						
Seed, private, spring	60,040	5,475			27,285	2,358		
Seed, private, fall	49,240	4,640			27,283	2,357		
Scallops, bay							676	75
Turtles:								
Loggerhead							225	2
Snapper							1,335	210
Total	6,006,666	311,773	97,500	10,471	477,646	83,661	33,695,505	830,227

Fisheries of New Jersey, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Cumberland		Gloucester		Hunterdon		Mercer	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,650	$41			10,600	$178	16,000	$285
Bluefish	1,020	85						
Butterfish	300	15						
Carp	18,710	2,409	22,000	$3,300	1,850	269	1,250	200
Catfish and bullheads	11,980	949			133	20		
Cod	19,500	750						
Croaker	18,015	710						
Eels	13,500	1,210					2,667	500
Flounders	2,000	120						
Shad	47,955	6,438	5,378	1,704	4,933	1,771	9,592	2,076
Spot	11,000	340						
Squeteagues or "sea trout", gray	53,200	2,529						
Striped bass	935	148						
Sucker					20,500	1,500	15,500	1,550
White perch	6,860	374						
Crabs:								
Hard	2,300	216						
King	366,667	800						
Soft	2,000	285						
Clams:								
Hard, public	3,320	570						
Hard, private	17,610	2,915						
Surf or skimmer	37,500	3,000						
Oysters:								
Market, public, spring	26,340	2,395						
Market, public, fall	57,080	4,603						
Market, private, fall	13,374,025	1,484,442	15,000	1,665				
Seed, public, spring	11,323,940	1,689,406	44,000	6,600				
Seed, public, fall	77,060	5,272						
Seed, private, spring	48,000	7,200						
Terrapin, diamond-back	173	61						
Turtles:								
Loggerhead	10	1						
Snapper	1,200	120						
Total	25,543,850	3,217,404	86,378	13,269	38,016	3,738	45,009	4,611

Species	Middlesex		Monmouth		Ocean		Salem	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					341,400	$6,684		
Bluefish	34,550	$2,766	703,704	$59,063	573,088	44,761		
Bonito			137,760	6,385	131,006	7,161		
Butterfish			690,995	35,023	1,638,922	88,316		
Carp							77,650	$9,075
Catfish and bullheads					1,150	72	2,785	229
Cod			729,974	24,597	701,465	24,333		
Croaker			196	14	90,153	3,731		
Cusk					4,400	132		
Eels	1,344	161	293,841	29,936	109,254	10,296	5,940	618
Flounders	113	8	206,946	14,074	253,798	15,612		
Goosefish			4,200	53				
Grayfish			3,600	54				
Hake			66,524	921	74,594	1,065		
Herring:								
Round			56,910	4,268				
Sea	1,270	28	248,622	1,989	108,016	1,041		
King whiting or "kingfish"			11,476	1,037	23,965	2,011		
Mackerel			122,255	5,028	40,090	2,404		
Menhaden	290	10	3,194,362	24,731	373,491	3,490		
Mullet	14,004	840	16,000	320	1,500	46		
Mummichog	6,200	724	400	50				
Pollock			218	9	870	44		
Scup or porgy			1,013,416	20,269	1,262,695	21,490		
Sea bass			323,251	10,631	1,380,506	52,389		
Sea robin			13,000	130	48,466	485		
Shad			23,497	4,489	30,507	5,033	55,806	9,867
Sharks			5,040	126	21,500	413		
Silversides	5,604	672						
Skates			10,600	83	41,700	208		
Spanish mackerel			209,063	31,359	600	90		
Spot	550	22	76,128	2,154	37,568	1,129		
Squeteagues or "sea trout", gray	33,800	2,028	1,634,814	70,425	2,582,331	85,330		
Striped bass	50	10			10,129	2,017		

Fisheries of New Jersey, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Middlesex		Monmouth		Ocean		Salem	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Tautog			3,091	$218	11,210	$367		
Thimble-eyed mackerel			13,052	392	72,670	2,180		
Tomcod	20	$1	25	1				
Tuna or "horse mackerel"			630	28	1,200	72		
White perch					235,235	28,14[illegible]		
Whiting			1,649,735	15,557	684,540	6,847		
Yellow perch					121,125	4,874		
Crabs:								
Hard	10,851	653	121,123	6,756			12,240	$612
Soft			4,000	1,000	9,600	3,700	4,352	1,632
Lobsters	3,750	1,050	591,290	150,431	54,901	15,446		
Shrimp					5,580	2,730		
Squid			212,212	5,467	396,352	11,891		
Clams:								
Hard, public	14,650	3,296	113,855	25,814	421,411	101,487		
Hard, private			11,446	3,262	2,922	718		
Soft, public			1,206,900	94,056				
Surf or skimmer			5,000	400				
Oysters:								
Market, public, spring			8,670	1,020	21,209	4,455		
Market, public, fall					13,220	2,409		
Market, private, spring			2,040	600	185,099	36,120		
Market, private, fall			2,040	600	183,991	35,981		
Seed, public, spring					13,247	1,070	36,000	5,400
Seed, public, fall			2,700	240				
Seed private, spring					306,563	24,318		
Seed, private, fall					900	70		
Scallops, sea			154,364	13,546				
Bloodworms	257	360	2,364	2,045				
Sandworms	771	1,080	6,665	6,595				
Total	128,074	13,709	13,907,994	675,246	12,624,122	662,700	184,773	27,433

PENNSYLVANIA

Fisheries of Pennsylvania, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, drift	Fyke nets	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*
Fishermen, on boats and shore, casual	62	13	1	75
Boats:				
Motor		5		5
Other	15	1	1	17
Apparatus:				
Number	16	7	30	
Length, yards	1,995			
Square yards		15,530		

CATCH: BY GEAR

Species	Haul seines		Gill nets, drift		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	40,000	$500	2,000	$50		
Carp	1,505	201				
Catfish and bullheads					1,000	$110
Shad	6,110	1,286	1,190	139		
Suckers	24,275	2,362				
Total	71,890	4,349	3,190	189	1,000	110

Fisheries of Pennsylvania, 1931—Continued

OPERATING UNITS: BY COUNTIES

Item	Bucks	Delaware	Philadelphia
	Number	*Number*	*Number*
Fishermen, on boats, and shore, casual	62	7	6
Boats:			
Motor		3	2
Other	15	1	1
Apparatus:			
Haul seines	16		
Length, yards	1,995		
Gill nets, drift		4	3
Square yards		10,980	4,550
Fyke nets		30	

CATCH: BY COUNTIES

Species	Bucks		Delaware		Philadelphia	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	40,000	$500	2,000	$50		
Carp	1,505	201				
Catfish and bullheads			1,000	110		
Shad	6,110	1,286	1,080	102	110	$37
Suckers	24,275	2,362				
Total	71,890	4,349	4,080	262	110	37

DELAWARE

Fisheries of Delaware, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets			Lines		
			Drift	Runaround	Stake	Hand	Trawl	Trot with baits or snoods
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	102							
On boats and shore:								
Regular		115	38	39	25	25	16	
Casual		185	59	41	28	5	4	1
Total	102	300	97	80	53	30	20	1
Vessels:								
Steam	2							
Net tonnage	230							
Motor	1							
Net tonnage	104							
Total vessels	3							
Total net tonnage	334							
Boats:								
Motor			36	16	5	9	9	
Other		80	12	21	20	3	1	1
Accessory boats	9	3		4	3	1		
Apparatus:								
Number	3	78	75	48	167	32	26	1
Length, yards	1,200	22,175						
Square yards			195,285	44,100	15,760			
Hooks, baits, or snoods						64	18,900	50

Fisheries of Delaware, 1931—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pound nets	Stop nets	Fyke nets	Dip nets	Cast nets	Pots	
						Eel	Lobster
Fishermen:							
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	4	6	21	17		14	12
Casual	35	35	31	17	4	20	
Total	39	41	52	34	4	34	12
Boats:							
Motor	1		3			3	3
Other	18	21	16	19		18	
Accessory boats	1		1			1	
Apparatus:							
Number	59	39	333	34	4	805	160
Square yards		9,584					

Item	Spears	Dredges		Tongs	Gaffs	By hand	Total, exclusive of duplication
		Clam	Oyster				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		30	96				204
On boats and shore:							
Regular		7		54			179
Casual	6	1		33	1	27	354
Total	6	38	96	87	1	27	737
Vessels:							
Steam							2
Net tonnage							230
Motor		5	14				16
Net tonnage		79	200				326
Sail			3				3
Net tonnage			39				39
Total vessels		5	17				21
Total net tonnage		79	239				595
Boats:							
Motor	2	5		4			73
Other	3			78			185
Accessory boats				9			32
Apparatus:							
Number	6	20	34	87	1		
Yards at mouth		17	42				

CATCH: BY GEAR

Species	Purse seines, menhaden		Haul seines		Gill nets			
					Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			2,138,189	$7,664	26,500	$394		
Bluefish			600	36	65,100	3,275	1,050	$56
Carp			35,695	3,212				
Catfish and bullheads			14,837	1,400				
Croaker			64,350	2,202	51,450	1,835	126,612	3,876
Eels			3,411	393				
Flounders			14,550	1,140				
King whiting or "kingfish"			1,890	78				
Menhaden	14,280,600	$93,299						
Mullet							582,500	39,825
Shad			7,400	1,200	27,131	5,152		
Spot			600	12	197,000	7,025	2,898	85
Squeteagues or "sea trout", gray			228,900	8,978	53,250	1,948	78,500	2,021
Striped bass			16,818	3,148	15,000	4,050		
Sturgeon					4,670	934		
White perch			57,452	7,516	22,900	4,536		
Yellow perch			19,228	1,915				
Total	14,280,600	93,299	2,603,921	38,894	463,001	29,149	791,557	45,863

Fisheries of Delaware, 1931—Continued

CATCH: BY GEAR—Continued

Species	Gill nets—Stake		Lines					
			Hand		Trawl		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	219,300	$1,669						
Bluefish	1,800	107	2,268	$203				
Catfish and bullheads	44	5						
Cod					50,628	$1,775		
Croaker			59,661	2,185				
Eels							2,605	$443
Flounders	41,100	2,575						
Mullet	17	2						
Scup			12,600	906				
Sea bass			9,600	679				
Shad	4,279	648						
Squeteagues or "sea trout", gray	18,000	720	21,057	1,415				
Striped bass	17,614	3,824						
Tautog			58,500	1,755				
White perch	21,274	3,074						
Total	323,428	12,624	163,686	7,143	50,628	1,775	2,605	443

Species	Pound nets		Stop nets		Fyke nets		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	31,320	$627			18,877	$366		
Carp	1,677	194	35,000	$4,121	378	20		
Catfish and bullheads	9,633	975	650	52	1,759	142		
Eels	2,445	284			33,562	3,796		
Flounders	1,048	62			16,001	1,153		
Herring, sea					1,314	4		
Squeteagues or "sea trout", gray	320	32						
Striped bass	1,543	415			1,299	260		
White perch	9,080	605			20,710	3,147		
Yellow perch	770	48	320	32	7,210	702		
Crabs:								
King	594,332	892					33,600	$7,660
Soft								
Turtles, snapper					1,550	83		
Total	652,168	4,134	35,970	4,205	102,660	9,673	33,600	7,660

Species	Cast nets		Pots				Spears	
			Eel		Lobster			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	520	$84					900	$48
Catfish and bullheads							600	54
Eels			43,540	$5,326			600	66
Lobsters					11,250	$2,814		
Total	520	84	43,540	5,326	11,250	2,814	2,100	168

Species	Dredges				Tongs		Gaffs		By hand	
	Clam		Oyster							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, king									89,500	$134
Clams, hard, public	23,853	$4,388			1,600	$160				
Oysters:										
Market, public, fall					106,260	10,540				
Market, private, fall			236,914	$27,317	127,380	15,200				
Seed, public, spring			625,500	43,100	186,750	12,450				
Seed, public, fall					24,300	1,620				
Turtles, snapper							100	$5		
Total	23,853	4,388	862,414	70,417	446,290	39,970	100	5	89,500	134

Fisheries of Delaware, 1931—Continued

OPERATING UNITS: By COUNTIES

Item	Kent	New Castle	Sussex
Fishermen:	*Number*	*Number*	*Number*
On vessels	91		113
On boats and shore:			
Regular	95	5	79
Casual	86	54	214
Total	272	59	406
Vessels:			
Steam			2
Net tonnage			230
Motor	13		3
Net tonnage	188		138
Sail	3		
Net tonnage	39		
Total vessels	16		5
Total net tonnage	227		368
Boats:			
Motor	25	16	32
Other	73	22	90
Accessory boats	14		18
Apparatus:			
Purse seines, menhaden			3
Length, yards			1,200
Haul seines	23	14	41
Length, yards	7,310	1,840	13,025
Gill nets:			
Drift	10	26	39
Square yards	21,000	135,725	38,560
Runaround	6		42
Square yards	20,000		24,100
Stake	36		131
Square yards	5,930		9,830
Lines:			
Hand	6		26
Hooks	12		52
Trawl	10		16
Hooks	6,900		12,000
Trot with baits or snoods		1	
Baits or snoods		50	
Pound nets	17	13	29
Stop nets	8	31	
Square yards	3,200	6,384	
Fyke nets	47	68	218
Dip nets			34
Cast nets	3	1	
Pots:			
Eel	132		673
Lobster			160
Spears			6
Dredges:			
Clam	18		2
Yards at mouth	15		2
Oyster	30		4
Yards at mouth	37		5
Tongs	68		19
Gaffs		1	

Fisheries of Delaware, 1931—Continued

CATCH: BY COUNTIES

Species	Kent		New Castle		Sussex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	800	$16	2,000	$91	2,431,386	$10,613
Bluefish					70,818	3,677
Carp	4,360	670	50,335	5,853	19,475	1,156
Catfish and bullheads	1,932	278	15,181	1,379	10,410	971
Cod	14,628	575			36,000	1,200
Croaker	117,061	4,611			185,012	5,487
Eels	12,007	1,376	16,815	2,007	57,341	6,925
Flounders					72,699	4,930
Herring, sea					1,314	4
King whiting or "kingfish"	990	54			900	24
Menhaden					14,280,600	93,299
Mullet	17	2			582,500	39,825
Scup					12,600	906
Sea bass					9,600	679
Shad	4,279	648	17,651	3,820	16,880	2,532
Spot					200,495	7,122
Squeteagues or "sea trout", gray	179,827	8,292			220,200	6,822
Striped bass	32,140	7,356	260	52	19,874	4,289
Sturgeon			4,670	934		
Tautog					58,500	1,755
White perch	40,628	6,175	5,400	472	85,388	12,231
Yellow perch	80	7	2,234	194	25,215	2,496
Crabs:						
King	683,832	1,026				
Soft					33,600	7,660
Lobsters					11,250	2,814
Clams, hard, public	21,523	3,758			3,930	790
Oysters:						
Market, public, fall	78,540	7,180			27,720	3,360
Market, private, fall	343,530	40,000			20,764	2,517
Seed, public, spring	751,500	51,500			60,750	4,050
Seed, public, fall	24,300	1,620				
Turtles, snapper	1,550	83	100	5		
Total	2,313,524	135,227	114,646	14,807	18,555,221	228,134

FISHERIES OF THE CHESAPEAKE BAY STATES

(Area XXIII) [5]

The yield of fishery products in the Chesapeake Bay States (Maryland and Virginia) during 1931 amounted to 293,270,746 pounds, valued at $7,427,960. This is a decrease of 7 percent in the catch and 35 percent in the value of the catch as compared with the quantity and its value for 1930. Of the total catch in 1931, 186,412,085 pounds, valued at $2,871,929, were fish and 106,858,661 pounds, valued at $4,556,031, were shellfish and miscellaneous products. These fisheries gave employment to 20,689 fishermen, or 7 percent more than in 1930. Of the total number of fishermen employed during 1931, 2,106 regular fishermen were engaged on vessels and 13,286 regular and 5,297 casual fishermen were employed in the shore and boat fisheries.

[5] This is the number given to this area by the North American Council on Fishery Investigations It should be explained that there are included under this area craft owned in the area but at times fishing elsewhere. A notable example is the southern trawl fishery, which extends into area XXIV. Data on the operating units and catch of the fisheries of the Chesapeake Bay States have been taken largely from statistics collected by the State fishery agencies of Maryland and Virginia. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections.

Fisheries of the Chesapeake Bay States, 1931

SUMMARY OF CATCH

Product	Maryland		Virginia		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	16,369,929	$526,837	170,042,156	$2,345,092	186,412,085	$2,871,929
Shellfish, etc	50,263,900	2,178,995	56,594,761	2,377,036	106,858,661	4,556,031
Total	66,633,829	2,705,832	226,636,917	4,722,128	293,270,746	7,427,960

OPERATING UNITS: BY STATES

Item	Maryland	Virginia	Total
	Number	*Number*	*Number*
Fishermen:			
On vessels	845	1,261	2,106
On boats and shore:			
Regular	6,727	6,559	13,286
Casual	1,986	3,311	5,297
Total	9,558	11,131	20,689
Vessels:			
Steam	----------	19	19
Net tonnage	----------	2,104	2,104
Motor	3	101	104
Net tonnage	18	1,756	1,774
Sail	191	6	197
Net tonnage	2,191	39	2,230
Total vessels	194	126	320
Total net tonnage	2,209	3,899	6,108
Boats:			
Motor	4,263	4,220	8,483
Other	2,342	3,274	5,616
Accessory boats	22	54	76
Apparatus:			
Purse seines:			
Menhaden	----------	27	27
Length, yards	----------	8,020	8,020
Other	15	----------	15
Length, yards	3,906	----------	3,906
Haul seines	185	131	316
Length, yards	21,844	43,465	65,309
Gill nets:			
Anchor	39	----------	39
Square yards	21,260	----------	21,260
Drift	193	540	733
Square yards	397,015	487,555	884,570
Stake	3,113	14,021	17,134
Square yards	197,483	503,780	701,263
Lines:			
Hand	18	----------	18
Hooks	36	----------	36
Trot with baits or snoods	1,560	1,094	2,654
Baits or snoods	1,039,560	472,260	1,511,820
Trot with hooks	12	----------	12
Hooks	3,600	----------	3,600
Pound nets	721	2,208	2,929
Stop nets	3	----------	3
Square yards	5,650	----------	5,650
Fyke nets	1,741	832	2,573
Dip nets	1,776	745	2,521
Cast nets	2	----------	2
Otter trawls	----------	27	27
Yards at mouth	----------	795	795
Pots, eel	11,309	30	11,339
Scrapes	1,098	388	1,486
Yards at mouth	1,093	388	1,481
Dredges:			
Crab	----------	112	112
Yards at mouth	----------	224	224
Oyster	560	164	724
Yards at mouth	660	212	872
Scallop	----------	1,216	1,216
Yards at mouth	----------	811	811
Tongs	5,887	4,411	10,298
Rakes	85	843	928
Picks	----------	731	731

Fisheries of the Chesapeake Bay States, 1931—Continued

CATCH: BY STATES

Species	Maryland		Virginia		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7,826,879	$57,355	17,239,070	$150,980	25,065,949	$208,335
Black bass	18,983	2,198			18,983	2,198
Bluefish	472,863	33,684	342,710	22,105	815,573	55,789
Bonito	4,000	200	103,199	4,327	107,199	4,527
Butterfish	1,264,343	20,604	4,812,066	161,260	6,076,409	181,864
Cabio or crab eater	300	15			300	15
Carp	180,891	14,701	168,448	7,071	349,339	21,772
Catfish and bullheads	406,035	16,426	609,644	25,451	1,015,679	41,877
Cod			41,279	850	41,279	850
Croaker	900,625	20,124	12,398,368	242,926	13,298,993	263,050
Drum:						
Black	32,000	525	165,825	3,317	197,825	3,842
Red or redfish	11,000	225	22,339	903	33,339	1,128
Eels	322,894	20,223	74,968	3,276	397,862	23,499
Flounders	97,110	5,975	1,185,781	53,651	1,282,891	59,626
Gizzard shad	4,200	86	59,900	1,249	64,100	1,335
Haddock			58	2	58	2
Hake			24,865	558	24,865	558
Harvestfish			400	16	400	16
Hickory shad	6,901	136	60,440	1,371	67,341	1,507
King whiting or "kingfish"			36,475	1,264	36,475	1,264
Mackerel	40,300	1,245	59,696	3,572	99,996	4,817
Menhaden			112,919,925	368,570	112,919,925	368,570
Mullet	17,541	856	43,000	1,904	60,541	2,760
Pigfish	2,200	110	54,986	2,274	57,186	2,384
Pike or pickerel	14,474	2,205			14,474	2,205
Pompano	350	70			350	70
Scup	50,000	2,500	403,763	14,489	453,763	16,989
Sea bass	150,000	4,500	72,302	4,118	222,302	8,618
Sea robin	1,000	10			1,000	10
Shad	1,195,705	125,665	7,291,164	864,082	8,486,869	989,747
Sheepshead	800	80			800	80
Skates	1,500	30	2,000	25	3,500	55
Spanish mackerel	300	40	13,954	1,181	14,254	1,221
Spot	100,526	3,439	637,409	22,766	737,935	26,205
Squeteagues or "sea trout":						
Gray	1,159,075	71,526	10,279,231	294,749	12,438,306	366,275
Spotted	500	50	58,500	5,310	59,000	5,360
Striped bass	634,909	96,742	481,441	61,776	1,116,350	158,518
Sturgeon	150	30	6,036	1,105	6,186	1,135
Sunfish	1,200	36			1,200	36
Tautog	200	12			200	12
Thimble-eyed mackerel			68,592	2,747	58,592	2,747
Tomcod			87	3	87	3
White perch	296,073	15,861	235,195	11,113	531,268	26,974
Whiting			1,000	60	1,000	60
Yellow perch	154,102	9,353	68,040	4,671	222,142	14,024
Total	16,369,929	526,837	170,042,156	2,345,092	186,412,085	2,871,929
SHELLFISH, ETC.						
Crabs:						
Hard	29,930,550	415,588	28,963,130	389,413	58,893,680	805,001
Soft	3,910,610	286,196	1,712,400	101,791	5,623,010	387,987
Lobsters			12	2	12	2
Squid	30,000	750	381,212	11,398	411,212	12,148
Clams, hard	1,920	804	741,528	252,929	743,448	253,733
Oysters: [1]						
Market, public, spring	4,469,491	410,770	2,181,109	172,909	6,650,600	583,679
Market, public, fall	10,477,223	917,851	5,203,135	401,798	15,680,358	1,319,649
Market, private, spring	322,812	33,150	2,395,015	209,200	2,717,827	242,350
Market, private, fall	1,104,924	112,143	6,157,137	526,389	7,262,061	638,532
Seed, public, spring	14,870	743	2,513,110	77,372	2,527,980	78,115
Seed, public, fall			5,075,495	153,765	5,075,495	153,765
Seed, private, spring			45,000	1,080	45,000	1,080
Scallops, bay			1,226,478	78,990	1,226,478	78,990
Terrapin, diamond-back	1,500	1,000			1,500	1,000
Total	50,263,900	2,178,995	56,594,761	2,377,036	106,858,661	4,556,031
Grand total	66,633,829	2,705,832	226,636,917	4,722,128	293,270,746	7,427,960

[1] Statistics on oysters used in this table are based on yields of 7 pounds of meats to the bushel for market oysters and 5 pounds for seed oysters in both States.

Fisheries of the Chesapeake Bay States, 1931—Continued

PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	Maryland		Virginia		Total	
Crabs:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Hard, number	89,791,650	$415,588	86,889,390	$389,413	176,681,040	$805,001
Soft, do	15,446,909	286,196	6,849,600	101,791	22,296,509	387,987
Clams, hard, bushels	240	804	92,691	252,929	92,931	253,733
Oysters:						
Market, public, spring, do	638,499	410,770	311,587	172,909	950,086	583,679
Market, public, fall, do	1,496,746	917,851	743,305	401,798	2,240,051	1,319,649
Market, private, spring, do	46,116	33,150	342,145	209,200	388,261	242,350
Market, private, fall, do	157,846	112,143	879,591	526,389	1,037,437	638,532
Seed, public, spring, do	2,974	743	502,622	77,372	505,596	78,115
Seed, public, fall, do			1,015,099	153,765	1,015,099	153,765
Seed, private, spring, do			9,000	1,080	9,000	1,080
Scallops, bay, do			204,413	78,990	204,413	78,990

Industries related to the fisheries of the Chesapeake Bay States, 1931

OPERATING UNITS, SALARIES, AND WAGES

Item	Maryland	Virginia	Total
Transporting:	*Number*	*Number*	*Number*
Persons engaged	300	557	857
Vessels:			
Motor	140	275	415
Net tonnage	2,042	3,189	5,231
Sail	9		9
Net tonnage	267		267
Total vessels	149	275	424
Total net tonnage	2,309	3,189	5,498
Wholesale and manufacturing:			
Establishments	342	222	564
Persons engaged:			
Proprietors	633	277	910
Salaried employees	267	122	389
Wage earners:			
Average for season	6,512	4,522	11,034
Average for year	2,753	1,960	4,713
Paid to salaried employees	$355,712	$165,179	$520,891
Paid to wage earners	1,353,246	928,283	2,281,529
Total salaries and wages	1,708,958	1,093,462	2,802,420
Fishermen manufacturing	76		76

PRODUCTS MANUFACTURED

Item	Maryland		Virginia	
By manufacturing establishments:				
Alewives:				
Salted:	*Quantity*	*Value*	*Quantity*	*Value*
Corned, pounds	65,600	$1,546	1,530,837	$31,838
Tight-pack cut, do	437,090	12,606	4,987,720	143,067
Tight-pack roe, do	46,350	2,515	12,800	1,152
Pickled, do	1,698,996	54,396	252,639	6,858
Canned, standard cases	17,650	41,155	16,970	37,818
Roe canned, do	7,896	35,416	21,270	83,264
Dry scrap, tons	[1]	[1]	515	19,113
Oil, gallons	[1]	[1]	16,696	2,598
Croaker, fresh pandressed, pounds			40,900	4,229
Haddock, fresh fillets, do			171,660	26,210
Menhaden:				
Dry scrap, tons			11,373	366,107
Oil, gallons			1,122,974	169,471
Squeteague:				
Fresh pandressed, pounds			212,800	16,944
Fresh fillets, do			376,700	39,604

[1] Included under unclassified products.

Industries related to the fisheries of the Chesapeake Bay States, 1931—Continued

PRODUCTS MANUFACTURED—Continued

Item		Maryland		Virginia	
		Quantity	*Value*	*Quantity*	*Value*
By manufacturing establishments—Continued.					
Crab meat, packaged, fresh-cooked	pounds	4,364,304	$925,179	1,429,372	$466,689
Oysters:					
Fresh-shucked	gallons	1,858,114	2,181,131	1,226,850	1,800,639
Shell products:					
Poultry feed	tons	34,105	235,504	19,941	175,669
Lime	do	15,613	32,758	12,495	63,486
Lime "burned"	do			11,207	85,884
Scallops, bay, fresh-shucked	gallons			127,758	134,550
Unclassified products:					
Pandressed and fresh fillets	pounds			[2] 102,040	[2] 14,011
Miscellaneous			[3] 625,095		[4] 69,124
Total			4,147,301		3,758,325
By fishermen:					
Alewives, salted:					
Corned	pounds	6,600	220		
Tight-pack cut	do	37,280	1,165		
Eels, salted	do	71,300	4,602		
Total		115,180	5,987		
Grant total			4,153,288		3,758,325

[2] Includes pandressed butterfish, flounders, haddock, sea bass and spot; and fresh fillets of croaker, flounders, and sea bass.

[3] Includes packaged alewife roe; smoked alewives, butterfish, carp, cisco, eels, sea herring, lake trout, salmon, shad, sturgeon, whitefish, etc.; canned cat and dog food; alewife dry scrap and oil; blue crab dry scrap; and marine-shell products.

[4] Includes sturgeon cavair, fresh-shucked hard clams, canned crab meat, dry scrap from blue crabs, and miscellaneous fish; and fish meal, and oil.

NOTE.—The total value of manufactured products in the Chesapeake Bay States was as follows: By manufacturing establishments, $7,905,626; and by fishermen, $5,987. Some of the above products may have been manufactured from products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons employed on transporting craft all have also been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, all have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

MARYLAND

Fisheries of Maryland, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines	Haul seines	Gill nets			Lines			Pound nets	Stop nets
			Anchor	Drift	Stake	Hand	Trot with baits or snoods	Trot with hooks		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	75									
On boats and shore:										
Regular	28	309	27	152	148	18	1,491	12	636	6
Casual		181	52	206	98		55		89	4
Total	103	490	79	358	246	18	1,546	12	725	10
Vessels:										
Motor	1									
Net tonnage	7									
Sail	10									
Net tonnage	194									
Total vessels	11									
Total net tonnage	201									
Boats:										
Motor	9	71	32	123	95	9	1,338	4	237	2
Other	2	164	18	69	78		191	8	154	3
Accessory boats	22									
Apparatus:										
Number	15	185	39	193	3,113	18	1,560	12	721	3
Length, yards	3,906	21,844								
Square yards			21,260	397,015	197,483					5,650
Hooks, baits, or snoods						36	1,039,560	3,600		

Fisheries of Maryland, 1931—Continued

OPERATING UNITS: By gear—Continued

Item	Fyke nets	Dip nets	Cast nets	Pots, eel	Scrapes	Dredges, oyster	Tongs	Rakes	By hand	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels						797	6			845
On boats and shore:										
Regular	69	1,183	2	212	591	159	4,848	25	12	6,727
Casual	87	593		12	14	24	697	60	10	1,986
Total	156	1,776	2	224	605	980	5,551	85	22	9,558
Vessels:										
Motor						2				3
Net tonnage						11				18
Sail						186				191
Net tonnage						2,094				2,191
Total vessels						188				194
Total net tonnage						2,105				2,209
Boats:										
Motor	75	599		148		16	3,147	55		4,263
Other	76	1,055	2	29	539	78	373	25	22	2,342
Accessory boats										22
Apparatus:										
Number	1,741	1,776	2	11,309	1,098	560	5,887	85		
Yards at mouth					1,093	660				

CATCH: By gear

Species	Purse seines		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			95,370	$853	7,000	$180	11,374	$113
Black bass			15,050	1,746				
Bluefish	208,186	$15,141	18,598	1,271	500	40	20,000	1,400
Carp			112,205	8,921			475	37
Catfish and bullheads			200,911	7,629			640	13
Croaker	63,183	2,264	125,530	2,807				
Eels			1,337	90				
Flounders			2,025	120				
Gizzard shad			200	6				
Hickory shad			1,000	20				
Mullet							9,800	630
Pike or pickerel			3,830	566				
Shad			1,975	255	26,596	2,991	327,967	28,154
Spot	500	20	19,500	696			1,250	25
Squeteagues or "sea trout", gray	202,577	12,134	19,323	871	12,050	485	2,000	200
Striped bass	155,595	23,027	75,498	11,349	38,155	5,983	97,836	15,708
Sunfish			950	25				
White perch			89,984	4,685	3,000	103	3,390	219
Yellow perch			17,883	1,290				
Crabs, soft			87,779	9,311				
Total	630,041	52,586	888,948	52,511	87,301	9,782	474,732	46,499

Fisheries of Maryland, 1931—Continued

CATCH: BY GEAR—Continued

Species	Gill nets—Stake		Lines					
			Hand		Trot, with baits or snoods		Trot, with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	13,950	$177						
Bluefish	1,400	130	138,000	$9,660				
Bonito			4,000	200				
Catfish and bullheads	25	1					7,200	$360
Croaker	3,830	105	1,000	20				
Eels							2,600	156
Flounders			8,000	640				
Mullet	5,000	107						
Scup			20,000	1,000				
Sea bass			140,000	4,200				
Shad	160,576	14,049						
Spot	200	10						
Squeteagues or "sea trout," gray	14,628	783	25,000	625				
Striped bass	63,943	10,864						
White perch	18,421	1,403						
Yellow perch	100	5						
Crabs, hard					29,015,540	$403,141		
Total	282,073	27,634	336,000	16,345	29,015,540	403,141	9,800	516

Species	Pound nets		Stop nets		Fyke nets		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7,694,885	$55,984			4,300	$48		
Black bass	815	135			3,118	317		
Bluefish	86,179	6,042						
Butterfish	1,264,343	20,604						
Cabio or crab eater	300	15						
Carp	18,634	1,411	26,200	$2,208	7,001	648		
Catfish and bullheads	96,032	4,153			101,227	4,270		
Croaker	707,082	14,928						
Drum:								
Black	32,000	525						
Red or redfish	11,000	225						
Eels	23,555	2,117			13,823	916		
Flounders	85,885	5,149			1,200	66		
Gizzard shad	4,000	80						
Hickory shad	5,901	116						
Mackerel	40,300	1,245						
Mullet	1,631	71			1,110	48		
Pigfish	2,200	110						
Pike or pickerel	4,545	615			6,099	1,024		
Pompano	350	70						
Scup	30,000	1,500						
Sea bass	10,000	300						
Sea robin	1,000	10						
Shad	678,541	80,211			50	5		
Sheepshead	800	80						
Skates	1,500	30						
Spanish mackerel	300	40						
Spot	79,076	2,688						
Squeteagues or "sea trout":								
Gray	1,883,497	56,428						
Spotted	500	50						
Striped bass	192,504	28,203			11,378	1,608		
Sturgeon	150	30						
Sunfish	250	11						
Tautog	200	12						
White perch	121,083	6,161			60,195	3,290		
Yellow perch	14,647	766			121,472	7,292		
Crabs:								
Hard							376,810	$5,071
Soft							1,725,594	127,906
Squid	30,000	750						
Total	13,123,685	290,865	26,200	2,208	330,973	19,532	2,102,404	132,977

Fisheries of Maryland, 1931—Continued

CATCH: BY GEAR—Continued

Species	Cast nets		Pots, eel		Scrapes		Dredges, oyster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	16,376	$1,476						
Eels			281,579	$16,944				
Crabs:								
Hard					538,200	$7,376		
Soft					2,097,237	148,979		
Oysters:								
Market, public, spring							873,995	$83,005
Market, public, fall							1,878,290	171,303
Market, private, spring							11,900	1,275
Market, private, fall							23,100	2,475
Total	16,376	1,476	281,579	16,944	2,635,437	156,355	2,787,285	258,058

Species	Tongs		Rakes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public	320	$122	1,280	$560	320	$122
Oysters:						
Market, public, spring	3,595,496	327,765				
Market, public, fall	8,598,933	746,548				
Market, private, spring	310,912	31,875				
Market, private, fall	1,081,824	109,668				
Seed, public, spring	14,870	743				
Terrapin, diamond-back					1,500	1,000
Total	13,602,355	1,216,721	1,280	560	1,820	1,122

OPERATING UNITS: BY COUNTIES

Item	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	13	77	10				222	
On boats and shore:								
Regular	647	20	221	6	14	149	1,108	10
Casual	225	16	217	21	136	258	33	72
Total	885	113	448	27	150	407	1,363	82
Vessels:								
Motor	3							
Net tonnage	18							
Sail		13	2				51	
Net tonnage		350	58				462	
Total vessels	3	13	2				51	
Total net tonnage	18	350	58				462	
Boats:								
Motor	442	13	186	8	56	118	685	45
Other	137	9	177	11	31	94	161	13
Accessory boats	2	10						
Apparatus:								
Purse seines	1	5						
Length, yards	300	1,300						
Haul seines	52	6	14	1	10	24		4
Length, yards	1,584	1,386	2,270	250	1,800	3,890		1,600
Gill nets:								
Anchor		2	2		25			
Square yards		1,200	560		7,500			
Drift	2	2		13	18	51	12	26
Square yards	600	3,600		4,205	21,600	220,335	3,600	31,200
Stake	112	23		7		706	213	600
Square yards	2,600	3,300		1,200		45,847	7,790	21,140
Lines:								
Trot with baits or snoods	129		82			38	336	
Baits or snoods	76,400		37,710			34,670	241,020	
Pound nets	46	6	26	12	26	53	190	6
Stop nets				2	1			
Square yards				4,200	1,450			
Fyke nets	68	23		34	768	14		109
Dip nets	65		140			63	150	
Pots, eel	363	490	18	55		36	1,989	565
Scrapes							52	
Yards at mouth							52	
Dredges, oyster		22	4				126	
Yards at mouth		33	6				147	
Tongs	733		308			201	701	

Fisheries of Maryland, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Kent	Prince Georges	Queen Annes	St. Marys	Somerset	Talbot	Wicomico	Worcester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	21			23	393	86		
On boats and shore:								
Regular	611	2	764	810	1,079	692	365	229
Casual	158	29	149	287	84	183	30	88
Total	790	31	913	1,120	1,556	961	395	317
Vessels:								
Sail	3			5	96	21		
Net tonnage	52			60	1,042	167		
Boats:								
Motor	351	3	462	347	701	524	202	120
Other	186	14	68	398	810	169	11	53
Accessory boats	6				2	2		
Apparatus:								
Purse seines	3				1	5		
Length, yards	776				260	1,270		
Haul seines	49	7	4	5	1	1		7
Length, yards	3,949	900	1,650	1,860	400	200		105
Gill nets:								
Anchor	10							
Square yards	12,000							
Drift	39	4	2		5	2	6	11
Square yards	102,400	2,635	450		1,065	480	2,700	2,145
Stake	891				403	12	144	2
Square yeards	101,464				8,340	790	4,412	600
Lines:								
Hand								18
Hooks								36
Trot with baits or snoods	244		181	181	73	248	5	43
Baits or snoods	96,160		106,740	164,000	63,700	182,060	3,000	34,100
Trot with hooks	12							
Hooks	3,600							
Pound nets	36	10	8	85	73	91	17	36
Fyke nets	619	36	4		8	44	14	
Dip nets	50		108	412	624	164		
Cast nets	2							
Pots, eel	623	6	361	12	368	6,423		
Scrapes					1,046			
Yards at mouth					1,041			
Dredges, oyster				12	322	42		32
Yards at mouth				12	380	55		27
Tongs	540		866	984	401	658	365	130
Rakes								85

CATCH: By counties

Species	Anne Arundel		Baltimore		Calvert		Caroline	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	732,475	$6,630	17,268	$182	581,575	$5,412	11,758	$80
Black bass					25	2	100	10
Bluefish	55,057	3,718	28,344	2,263	300	30	100	10
Butterfish	532	29			100	8		
Carp	3,982	297	2,384	170	939	35	6,875	662
Catfish and bullheads	91,873	2,791	6,154	270	4,070	143	12,031	381
Croaker	148,335	4,952	11,271	450	19,780	526	1,500	30
Eels	21,547	1,710	9,904	731	200	22	4,401	176
Flounders	4,484	233	634	17	840	62	100	5
Hickory shad	3,090	74	811	7				
Mullet							194	21
Pike or pickerel	1,342	269	250	42			99	23
Shad	69,438	8,219	529	75	44,483	5,267	3,854	490
Spot	34,975	1,356	398	8	1,100	35	500	10
Squeteagues or "sea trout", gray	183,599	9,415	89,741	5,438	3,200	178	1,500	75
Striped bass	31,423	5,478	95,831	13,828	9,233	1,669	12,620	1,841
White perch	7,864	548	7,920	439	7,850	360	14,294	488
Yellow perch	1,768	142	2,440	170	3,148	215	1,737	92
Crabs:								
Hard	3,177,000	59,865			1,145,700	14,321		
Soft	69,593	8,351			121,263	11,390		
Oysters:								
Market, public, spring	741,832	74,164	66,430	5,694	216,027	26,550		
Market, public, fall	1,485,008	127,531	132,860	11,388	390,796	48,063		
Market, private, spring					75,544	9,505		
Market, private, fall					251,811	30,534		
Total	6,865,217	315,772	473,169	41,172	2,877,984	154,327	71,663	4,394

Fisheries of Maryland, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Cecil		Charles		Dorchester		Harford	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	286,874	$3,425	136,000	$1,046	928,719	$7,720	213,810	$2,138
Black bass	7,805	694	4,855	759	50	5	2,000	200
Bluefish			300	30	26,497	1,810		
Butterfish					350	30		
Carp	35,529	3,066	56,009	3,877	3,763	160	13,700	1,096
Catfish and bullheads	78,312	3,741	65,901	3,003	4,043	206	5,038	201
Croaker			2,150	77	100,789	1,381		
Eels	10,054	678	6,390	365	42,861	2,507	11,200	694
Flounders			250	16	24,123	958		
Gizzard shad			4,200	86				
Hickory shad					500	10		
Mullet	636	13					350	7
Pike or pickerel	6,629	950	606	118	250	20	1,600	245
Shad	60,688	7,081	306,790	21,059	119,887	15,132	23,758	2,858
Spot			650	21	2,393	78		
Squeteagues or "sea trout", gray			1,670	61	37,899	1,414		
Striped bass	42,135	6,320	35,115	5,370	41,556	6,013	16,106	2,587
Sunfish			800	24				
White perch	26,859	1,412	54,741	3,396	35,943	988	3,226	173
Yellow perch	34,746	2,197	7,534	564	365	19	1,560	135
Crabs:								
Hard			487,995	6,739	7,408,510	92,533		
Soft			25,670	2,426	465,545	27,932		
Oysters:								
Market, public, spring			25,808	3,497	560,287	50,081		
Market, public, fall			103,307	14,003	1,203,760	101,556		
Market, private, spring			20,503	2,183	15,400	1,510		
Market, private, fall			57,708	6,596	88,039	8,530		
Total	590,267	29,577	1,404,952	75,316	11,111,529	320,593	292,348	10,334

Species	Kent		Prince Georges		Queen Annes		St. Marys	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	219,174	$1,415	6,100	$61	6,100	$37	980,551	$8,811
Black bass	30	3	3,700	468				
Bluefish	22,958	1,835			10,411	604	13,171	1,114
Butterfish	600	60					6,261	287
Carp	38,782	3,809	12,076	917	1,048	123	850	34
Catfish and bullheads	77,140	3,264	8,090	254			3,600	168
Croaker	56,912	1,276			20,250	430	51,225	1,491
Eels	23,100	1,507	1,400	111	4,900	387	1,050	63
Flounders	1,104	54			250	25	8,600	536
Hickory shad	1,000	20						
Mullet	916	27	45	3				
Pike or pickerel	778	156	160	37	10	1	2,500	312
Shad	104,413	11,227	6,660	540	280	63	102,404	11,709
Spot	4,500	105			1,285	56	19,800	815
Squeteagues or "sea trout", gray	114,500	6,049	200	15	1,800	156	34,792	2,022
Striped bass	207,086	34,249	525	65	8,852	1,304	56,728	8,177
Sunfish			350	7				
White perch	73,038	4,423	13,334	682	2,750	156	13,500	752
Yellow perch	58,730	3,418	2,975	272	3,500	232	500	30
Crabs:								
Hard	2,395,400	35,931			3,540,000	53,100	1,909,645	24,318
Soft	39,039	4,125			50,841	4,068	172,078	15,636
Oysters:								
Market, public, spring	369,320	29,018			737,520	59,417	262,667	21,351
Market, public, fall	1,107,960	87,104			2,212,567	178,247	1,041,242	85,144
Market, private, spring							19,852	2,095
Market, private, fall					18,200	1,560	62,827	6,495
Seed, public, spring	14,870	743						
Total	4,931,350	229,818	55,615	3,432	6,620,564	299,966	4,763,843	191,360

Fisheries of Maryland, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Somerset		Talbot		Wicomico		Worcester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	643,500	$6,260	3,025,475	$13,483	32,500	$630	5,000	$25
Black bass			418	57				
Bluefish	12,125	894	140,600	9,876	3,000	300	160,000	11,200
Bonito							4,000	200
Butterfish	3,500	270			25,000	1,500	1,228,000	18,420
Cabio or crab eater							300	15
Carp	200	9	4,404	429	350	17		
Catfish and bullheads	8,000	374	26,483	1,007	15,300	623		
Croaker	140,030	1,803	268,883	5,733	38,500	1,155	41,000	820
Drum:								
Black					2,000	75	30,000	450
Red or redfish					1,000	25	10,000	200
Eels	11,800	737	157,587	8,905	1,500	130	15,000	1,500
Flounders	10,250	422	1,975	167	4,000	240	40,500	3,240
Hickory shad	1,500	25						
Mackerel					300	45	40,000	1,200
Mullet					600	48	14,800	737
Pigfish	2,200	110						
Pike or pickerel	50	12			200	20		
Pompano					250	50	100	20
Scup							50,000	2,500
Sea bass							150,000	4,500
Sea robin							1,000	10
Shad	122,080	15,054	194,951	22,324	33,490	4,267	2,000	300
Sheepshead					800	80		
Skates							1,500	30
Spanish mackerel							300	40
Spot	7,000	269	1,175	51	2,500	150	24,250	485
Squeteagues or "sea trout":								
Gray	73,974	2,648	75,700	4,495	38,500	2,010	1,502,000	37,550
Spotted					500	50		
Striped bass	17,712	2,574	43,637	5,017	16,350	2,250		
Sturgeon					150	30		
Sunfish					50	5		
Tautog							200	12
White perch	10,000	662	19,854	928	4,900	454		
Yellow perch			30,099	1,717	5,000	150		
Crabs:								
Hard	3,220,000	43,336	6,474,700	83,519	71,600	926	100,000	1,000
Soft	2,860,055	205,720	99,326	5,972			7,200	576
Squid							30,000	750
Clams, hard, public							1,920	804
Oysters:								
Market, public, spring	627,585	62,289	728,833	67,293	133,182	11,416		
Market, public, fall	1,277,503	126,443	1,254,302	115,408	267,918	22,964		
Market, private, spring	84,308	8,008			76,405	6,549	30,800	3,300
Market, private, fall	259,931	24,626	51,373	5,509	254,835	21,843	60,200	6,450
Terrapin, diamond-back	1,500	1,000						
Total	9,394,803	503,546	12,599,775	351,890	1,030,680	78,002	3,550,070	96,334

VIRGINIA

Fisheries of Virginia, 1931

OPERATING UNITS: By GEAR

Item	Purse seines	Haul seines	Gill nets		Lines, trot with baits or snoods	Pound nets	Fyke nets	Dip nets	Otter trawls
			Drift	Stake					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	899								103
On boats and shore:									
Regular		298	296	219	998	1,726	61	337	
Casual		203	498	292	96	600	94	408	
Total	899	501	794	511	1,094	2,326	155	745	103
Vessels:									
Steam	19								
Net tonnage	2,104								
Motor	8								27
Net tonnage	748								394
Total vessels	27								27
Total net tonnage	2,852								394
Boats:									
Motor		102	129	183	889	649	86	161	
Other		125	397	189	195	521	78	584	
Accessory boats	54								
Apparatus:									
Number	27	131	540	14,021	1,094	2,208	832	745	27
Length, yards	8,020	43,465							
Square yards			487,555	503,780					
Yards at mouth									795
Hooks, baits, or snoods					472,260				

Item	Pots, eel	Scrapes	Dredges			Tongs	Rakes	Picks	By hand	Total, exclusive of duplication
			Crab	Oyster	Scallop					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels			161	96		14				1,261
On boats and shore:										
Regular	1	209	18	96	624	3,466	843	731	365	6,559
Casual						1,378				3,311
Total	1	209	179	192	624	4,848	843	731	365	11,131
Vessels:										
Steam										19
Net tonnage										2,104
Motor			50	14		5				101
Net tonnage			427	191		32				1,756
Sail				6						6
Net tonnage				39						39
Total vessels			50	20		5				126
Total net tonnage			427	230		32				3,899
Boats:										
Motor	1		6	60	300	2,873	88	45	22	4,220
Other		179		62	255	615	740	648	343	3,274
Accessory boats										54
Apparatus:										
Number	30	388	112	164	1,216	4,411	843	731		27,574
Yards at mouth		388	224	212	811					

Fisheries of Virginia, 1931—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			33,700	$484	32,525	$561	17,680	$274
Bluefish			32,900	2,540	3,700	274		
Butterfish			1,600	80				
Carp			134,409	5,744				
Catfish and bullheads			303,894	12,627				
Croaker			273,040	6,934	205,200	4,786	2,000	62
Drum, red or redfish			6,180	249	900	46		
Eels			200	10				
Flounders			40,150	1,660				
Gizzard shad			27,200	544	3,200	96	3,000	64
Hickory shad			500	15	14,725	444	1,200	24
Menhaden	111,381,950	$363,440						
Mullet			400	20	15,700	745	25,200	1,054
Pigfish			21,000	862	8,000	320		
Shad			10,930	1,236	643,461	72,166	504,610	67,073
Spanish mackerel			2,900	290	2,000	200		
Spot			232,830	8,885	94,400	3,306		
Squeteagues or "sea trout":								
Gray			190,100	8,827	4,300	215	4,800	240
Spotted			52,500	4,710				
Striped bass			108,154	15,044	45,320	7,776	64,190	9,314
White perch			125,000	6,220	2,150	109		
Whiting					1,000	60		
Yellow perch			12,400	868				
Total	111,381,950	363,440	1,609,987	77,849	1,076,581	91,104	622,680	78,105

Species	Lines, trot with baits or snoods		Pound nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			17,128,015	$149,208	25,200	$420
Bluefish			306,043	19,287		
Bonito			103,199	4,327		
Butterfish			4,808,106	161,092		
Carp			16,850	674	17,189	653
Catfish and bullheads			40,600	1,732	265,150	11,092
Cod			39,889	797	300	12
Croaker			11,542,648	220,879	62,100	1,790
Drum:						
Black			165,825	3,317		
Red or redfish			15,144	604		
Eels			61,180	2,689	12,570	540
Flounders			625,510	26,156	8,000	351
Gizzard shad			8,600	184	17,900	361
Harvestfish			400	16		
Hickory shad			42,875	863	1,140	25
King whiting or "kingfish"			20,030	776		
Mackerel			59,696	3,572		
Menhaden			1,537,975	5,130		
Mullet			1,000	50	700	35
Pigfish			23,320	1,015	1,100	44
Scup or porgy			166,136	5,964		
Sea bass			19,878	1,349		
Shad			6,122,383	722,291	9,780	1,316
Skates			2,000	25		
Spanish mackerel			9,054	691		
Spot			307,395	10,522	1,800	32
Squeteagues or "sea trout":						
Gray			9,996,040	282,571	19,700	885
Spotted			6,000	600		
Striped bass			218,427	25,471	45,350	4,171
Sturgeon			4,975	899		
Thimble-eyed mackerel			68,592	2,747		
White perch			56,240	2,364	50,780	2,391
Yellow perch					55,640	3,803
Crabs, hard	21,354,660	$284,017				
Squid			376,438	11,293		
Total	21,354,660	284,017	53,900,463	1,669,155	594,339	27,921

Fisheries of Virginia, 1931—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Otter trawls		Pots, eel		Scrapes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,30	$26	650	$7				
Bluefish			67	4				
Butterfish			2,360	88				
Cod			1,090	41				
Croaker			313,380	8,475				
Drum, red or redfish			115	4				
Eels			418	13	600	$24		
Flounders			512,121	25,484				
Haddock			58	2				
Hake			24,865	558				
King whiting or "kingfish"			16,445	488				
Pigfish			1,566	33				
Scup or porgy			237,627	8,525				
Sea bass			52,424	2,769				
Spot			984	21				
Squeteagues or "sea trout", gray			64,291	2,011				
Sturgeon			1,061	206				
Tomcod			87	3				
White perch			1,025	29				
Crabs:								
Hard	44,000	660					350,470	$4,711
Soft	603,280	35,301					1,109,120	66,490
Lobsters			12	2				
Squid			4,774	105				
Total	648,580	35,987	1,235,420	48,868	600	24	1,459,590	71,201

Species	Dredges						Tongs	
	Crab		Oyster		Scallop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard	7,214,000	$100,025						
Clams, hard							523,016	$173,676
Oysters:								
Market, public, spring			21,140	$1,812			2,057,853	165,262
Market, public, fall			45,920	3,936			4,952,626	386,171
Market, private, spring			763,238	64,806			1,490,118	135,149
Market, private, fall			2,061,962	169,514			3,817,107	338,685
Seed, public, spring							2,513,110	77,372
Seed, public, fall							5,075,495	153,765
Scallops, bay					1,226,478	$78,990		
Total	7,214,000	100,025	2,892,260	240,068	1,226,478	78,990	20,429,325	1,430,080

Species	Rakes		Picks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard	100,768	$36,027	76,872	$27,900	40,872	$15,326
Oysters:						
Market, public, spring	350	20			101,766	5,815
Market, public, fall	1,050	60			203,539	11,631
Market, private, spring	141,659	9,245				
Market, private, fall	278,068	18,190				
Seed, public, fall	45,000	1,080				
Total	566,895	64,622	76,872	27,900	346,177	32,772

Fisheries of Virginia, 1931—Continued

OPERATING UNITS: By counties

Item	Accomac	Alexandria	Caroline	Charles City	Chesterfield	Dinwiddie	Elizabeth City	Essex	Fairfax
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	27						117		
On boats and shore:									
Regular	1,566	14		174			305	60	
Casual	62	12	4	64	25	16	8	83	52
Total	1,655	26	4	238	25	16	430	143	52
Vessels:									
Motor	1						30		
Net tonnage	6						383		
Sail	6								
Net tonnage	39								
Total vessels	7						30		
Total net tonnage	45						383		
Boats:									
Motor	605	2		16	1		106	38	26
Other	831	14	1	138	13	12	10	71	20
Apparatus:									
Haul seines	13		1	8	1			2	1
Length, yards	5,400		200	3,200	300			400	100
Gill nets:									
Drift	1	12		213	10		6	8	16
Square yards	2,400	29,630		135,200	6,000		5,400	5,600	43,400
Stake	67					360			1
Square yards	2,600					6,840			400
Lines:									
Trot with baits or snoods	118						19		
Baits or snoods	65,100						13,300		
Pound nets	256						300	1	
Fyke nets	8	12		4	6			5	249
Dip nets	160								
Otter trawls							11		
Yards at mouth							325		
Scrapes	388								
Yards at mouth	388								
Dredges:									
Crab							30		
Yards at mouth							60		
Oyster	136						8		
Yards at mouth	169						12		
Scallop	446								
Yards at mouth	298								
Tongs	670						45	118	
Rakes	319								
Picks	360								

Item	Gloucester	Henrico	Isle of Wight	James City	King and Queen	King George	King William	Lancaster	Mathews
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			3					211	16
On boats and shore:									
Regular	123		275	68		40	24	366	338
Casual	395	134	94	20	62	63	64	553	387
Total	518	134	372	88	62	103	88	1,130	741
Vessels:									
Steam								2	
Net tonnage								184	
Motor			1					8	4
Net tonnage			5					329	36
Total vessels			1					10	4
Total net tonnage			5					513	36
Boats:									
Motor	335	2	180	37	2	49	24	414	339
Other	48	96	68	19	38	28	36	127	145
Accessory boats								12	

Fisheries of Virginia, 1931—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Accomac	Alexandria	Caroline	Charles City	Chesterfield	Dinwiddie	Elizabeth City	Essex	Fairfax
Apparatus:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Purse seines, menhaden								6	
Length, yards								1,840	
Haul seines		7	2	3	1	5			4
Length, yards		1,260	400	1,100	100	6,500			1,700
Gill nets:									
Drift	9	17	8	7	39	2	32		
Square yards	7,200	10,880	3,200	4,200	23,400	6,435	19,200		
Stake		1,520	5,400	2,160		516			
Square yards		45,600	162,000	64,800		35,060			
Lines:									
Trot with baits or snoods	30		47			14		85	56
Baits or snoods	19,800		28,200			5,600		34,500	44,800
Pound nets	80		14			21		238	480
Fyke nets	11	2	105	45	3	23	11	2	
Dip nets		4						112	89
Dredges:									
Crab									2
Yards at mouth									4
Oyster								8	6
Yards at mouth								12	9
Tongs	416		248	14		27	24	482	227

Item	Middlesex	Nansemond	New Kent	Norfolk	Northampton	Northumberland	Prince George	Princess Anne
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	4	3		25	3	704		
On boats and shore:								
Regular	569	50	40	95	636	741	4	82
Casual	299	118	49	53	37	307	38	19
Total	872	171	89	173	676	1,752	42	101
Vessels:								
Steam						17		
Net tonnage						1,920		
Motor	1	1		4	1	5		
Net tonnage	8	6		95	11	464		
Total vessels	1	1		4	1	22		
Total net tonnage	8	6		95	11	2,384		
Boats:								
Motor	526	83	3	38	301	421	4	22
Other	22	24	70	62	455	572	18	33
Accessory boats						42		
Apparatus:								
Purse seines, menhaden						21		
Length, yards						6,180		
Haul seines	8		6	3	4	1	6	6
Length, yards	2,400		1,875	900	1,200	200	1,400	1,300
Gill nets:								
Drift	3	1	80		8		12	
Square yards	2,400	300	74,760		4,650		9,360	
Stake		1,110		33				
Square yards		44,400		1,320				
Lines:								
Trot with baits or snoods	75	5		56	47	369		33
Baits or snoods	33,000	1,000		16,800	33,700	87,600		13,200
Pound nets	17			20	138	453		13
Fyke nets		33	10		5	16	26	
Dip nets						380		
Otter trawls				2				
Yards at mouth				57				
Pots, eel							30	
Dredges:								
Crab					2			
Yards at mouth					4			
Oyster	2			4				
Yards at mouth	3			7				
Scallop					770			
Yards at mouth					513			
Tongs	750	138		56	195	201		30
Rakes					406			
Picks					371			

Fisheries of Virginia, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Prince William	Richmond	Spotsylvania	Stafford	Surry	Warwick	Westmoreland	York
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						12	3	133
On boats and shore:								
Regular	42	68	16	2	21	233	207	400
Casual	35	89	11	26	22	18	82	10
Total	77	157	27	28	43	263	292	543
Vessels:								
Motor						3	1	41
Net tonnage						46	7	360
Boats:								
Motor	35	46	13	17	26	128	140	241
Other	23	80	6	8	12	15	29	130
Apparatus:								
Haul seines	14		5	8	8		6	8
Length, yards	1,680		500	800	3,150		3,800	3,600
Gill nets:								
Drift	14	22		3				17
Square yards	32,340	35,200		9,600				16,800
Stake	175		16	6	1,320	1,337		
Square yards	13,340		31,165	2,855	39,600	53,800		
Lines:								
Trot with baits or snoods		1	14			2	94	29
Baits or snoods		380	4,200			600	36,740	33,740
Pound nets		19				58	67	33
Fyke nets	134	8	19	40	15	12	7	21
Otter trawls						3		11
Yards at mouth						90		323
Dredges:								
Crab						2		76
Yards at mouth						4		152
Tongs		102				203	173	292
Rakes								118

CATCH: By counties

Species	Accomac		Alexandria		Caroline		Charles City	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	735,650	$7,351					6,100	$87
Bluefish	61,250	4,326						
Bonito	62,500	2,500						
Butterfish	2,389,432	72,123						
Carp					1,200	$48	9,500	380
Catfish and bullheads	200	10	2,600	$130	1,500	60	10,200	408
Cod	11,000	220						
Croaker	3,142,202	65,258						
Drum:								
Black	161,825	3,237						
Red or redfish	14,000	558						
Eels	50,100	2,015						
Flounders	232,400	9,364					1,600	64
Gizzard shad							11,000	220
King whiting or "kingfish"	15,000	525						
Mullet	19,800	852						
Pigfish	5,100	217						
Scup or porgy	68,000	2,040						
Sea bass	3,700	222						
Shad	251,084	29,511	65,407	4,550			293,300	38,124
Skates	2,000	25						
Spanish mackerel	1,400	112						
Spot	82,230	2,180						
Squeteagues or "sea trout":								
Gray	3,536,556	90,477					1,200	60
Spotted	27,000	2,160						
Striped bass	13,350	1,793					10,200	1,530
Sturgeon	1,775	355						
Thimble-eyed mackerel	44,500	1,780						
White perch	7,540	196			500	40	3,600	144
Whiting								
Yellow perch			1,840	126				

Fisheries of Virginia, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Accomac		Alexandria		Caroline		Charles City	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:								
Hard	3,768,470	$49,446						
Soft	1,345,120	80,700						
Squid	231,000	6,930						
Clams, hard, public	211,352	78,782						
Oysters:								
Market, public, spring	177,471	12,455						
Market, public, fall	390,439	27,953						
Market, private, spring	511,938	49,176						
Market, private, fall	1,024,562	98,414						
Seed, public, spring	198,000	7,920						
Seed, public, fall	397,000	13,233						
Scallops, bay	709,200	44,505						
Total	19,904,146	768,921	69,847	$4,806	3,200	$148	346,700	$41,017

Species	Chesterfield		Dinwiddie		Elizabeth City		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	15,375	$205	2,600	$39	30,000	$300	5,000	$74
Bluefish					15,067	754		
Butterfish					601,877	12,070		
Carp	3,060	152					3,750	150
Catfish and bullheads	3,500	110					4,400	186
Cod					12,633	259		
Croaker					3,236,462	66,348		
Drum, red or redfish					95	3		
Eels	20	1			69	3	450	27
Flounders					310,774	15,058		
Gizzard shad					1,000	20		
Haddock					58	2		
Hake					9,415	189		
Hickory shad	840	25			6,000	120	75	3
King whiting or "kingfish"					8,327	226		
Mackerel					1,000	50		
Mullet					1,000	50		
Pigfish					3,989	80		
Scup or porgy					71,375	1,833		
Sea bass					22,298	1,244		
Shad	3,985	562	3,600	540	900,000	90,000	1,650	247
Spot					784	15		
Squeteagues or "sea trout", gray					648,634	13,476		
Striped bass	400	48	2,340	351			300	36
Sturgeon					2,331	459		
Tomcod					87	3		
White perch	180	8			10,555	212	4,650	258
Whiting					1,000	60		
Crabs, hard					2,952,000	36,900		
Lobsters					12	2		
Squid					2,669	60		
Clams, hard, public					102,400	35,840		
Oysters:								
Market, public, spring					8,400	480	53,067	6,064
Market, public, fall					19,600	1,080	159,194	18,192
Market, private, spring					147,000	11,800	82,320	8,232
Market, private, fall					413,000	33,400	246,960	24,696
Seed, public, spring					57,000	1,710		
Seed, public, fall					118,000	3,540		
Total	27,360	1,111	8,540	930	9,714,911	327,646	561,816	58,165

Species	Fairfax		Gloucester		Henrico		Isle of Wight	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			110,900	$1,109	7,380	$146	18,200	$364
Bluefish			7,600	380				
Butterfish			4,800	192				
Carp					5,400	270	24,500	980
Catfish and bullheads	95,040	$3,800	600	24	3,400	154	17,500	620
Cod					300	12		
Croaker			2,249,300	33,746			38,500	1,155
Eels			400	20			1,500	60
Flounders			17,400	696			7,600	304
Gizzard shad							17,000	340
Hickory shad			1,500	36			1,200	24
Mullet							5,400	162

Fisheries of Virginia, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Fairfax		Gloucester		Henrico		Isle of Wight	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Pigfish			1,100	$44				
Shad	87,743	$6,635	51,600	7,632	28,900	$4,330	164,600	$24,690
Spanish mackerel			1,100	55				
Spot			100,500	3,980				
Squeteagues or "sea trout", gray			568,700	14,235			25,500	1,275
Striped bass					12,460	1,836	26,700	3,264
White perch	10,000	500	300	15	2,000	120	14,500	580
Yellow perch	18,800	1,316	900	63				
Crabs, hard			1,104,000	16,560			188,000	2,350
Clams, hard, public			57,000	14,080				
Oysters:								
Market, public, spring			151,725	12,966			231,000	13,200
Market, public, fall			302,540	22,720			695,800	39,780
Market, private, spring			28,791	2,468			34,608	2,472
Market, private, fall			67,928	5,380			69,216	4,944
Seed, public, spring			102,500	3,075			629,865	18,896
Seed, public, fall			195,000	5,850			1,269,740	38,192
Total	211,583	12,251	5,126,184	145,326	59,840	6,868	3,480,929	153,652

Species	James City		King and Queen		King George		King William	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	11,000	$165			154,600	$1,590		
Carp	10,000	400						
Catfish and bullheads	14,700	512	1,200	$48	113,000	4,730	2,400	$96
Croaker	9,000	270					1,000	40
Eels			200	10				
Flounders	4,000	160	250	12			300	15
Gizzard shad	9,000	180	100	5			100	2
Hickory shad			12,500	375			1,200	36
Mullet			500	25			600	30
Shad	113,100	14,634	17,650	2,598	54,887	5,070	14,390	2,158
Spot							200	8
Squeteagues or "sea trout", gray	8,000	400	900	45			1,000	50
Striped bass	24,100	1,872	500	50	71,300	10,275	800	80
White perch	6,200	348	500	25	66,000	3,300	500	25
Yellow perch	1,500	60			8,600	602	600	36
Crabs, hard					210,000	2,625		
Oysters:								
Market, public, spring					9,450	1,315		
Market, public, fall					28,350	3,645		
Market, private, spring							63,000	5,400
Market, private, fall							189,000	16,200
Seed, public, spring	18,650	559						
Seed, public, fall	37,350	1,121						
Total	266,600	20,681	34,300	3,193	716,187	33,152	275,090	24,176

Species	Lancaster		Mathews		Middlesex		Nansemond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	822,000	$8,220	2,742,800	$25,769	13,000	$235		
Bluefish	14,800	888	37,360	3,048	6,000	360		
Butterfish	300,000	15,000	22,340	908				
Carp					25,000	1,000		
Catfish and bullheads							1,600	$64
Croaker	400	12	669,400	10,062	140,900	2,942	37,400	1,122
Eels	3,750	175			200	10		
Flounders	38,900	1,584	38,500	1,552	3,000	120		
Gizzard shad							3,600	108
Menhaden	24,311,600	81,038						
Pigfish			14,820	740				
Sea bass	644,262	77,511	1,861,800	245,010	17,800	2,670	28,040	4,196
Spot	75,300	2,262	53,980	2,314	95,500	2,865		
Squeteagues or "sea trout", gray	348,000	10,469	1,124,200	33,926	25,300	1,091		
Striped bass	13,200	1,617	22,300	2,676	17,800	2,136	500	75
White perch	10,300	470	7,000	350	7,800	332	200	8
Crabs:								
Hard	1,111,500	16,672	1,182,000	14,930	784,500	9,806	70,000	1,050
Soft	70,400	5,984	17,280	1,037				
Oysters:								
Market, public, spring	144,928	12,422	67,487	6,771	213,640	24,415	81,375	4,650
Market, public, fall	434,798	37,268	189,413	17,522	640,934	57,865	389,725	22,310
Market, private, spring	390,586	33,479	83,391	8,278	135,968	15,539	93,625	5,350
Market, private, fall	1,185,758	101,636	222,950	21,722	264,929	22,827	280,875	16,050
Seed, public, spring			11,500	345	19,000	570	45,000	1,350
Seed, public, fall			34,500	1,035	38,000	1,140	142,500	4,350
Total	29,920,482	406,707	8,403,021	397,995	2,449,271	145,923	1,174,440	60,683

Fisheries of Virginia, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	New Kent		Norfolk		Northampton		Northumberland	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	6,500	$130			9,025	$90	9,979,840	$86,113
Bluefish			11,000	$880	56,133	2,959	14,000	840
Bonito					40,699	1,827		
Butterfish			24,500	980	1,349,734	54,489	63,500	3,140
Carp	11,600	464						
Catfish and bullheads	8,000	240						
Cod					16,889	337		
Croaker			109,205	2,992	704,786	18,758	1,444,000	26,068
Drum:								
Black					4,000	80		
Red or redfish					1,824	85		
Eels			349	10	9,280	523	5,600	280
Flounders			32,459	1,511	70,610	2,888	43,200	1,728
Gizzard shad	6,500	130						
Hake			2,125	42				
Harvestfish					400	16		
Hickory shad							36,600	732
King whiting or "kingfish"					5,030	251		
Mackerel					58,696	3,522		
Menhaden					1,175	8	88,607,150	287,524
Mullet					13,700	685		
Pigfish			245	5	400	20		
Scup or porgy			76,836	2,300	98,136	3,924		
Sea bass			1,521	69	16,178	1,127		
Shad	51,000	6,808	79,500	11,925	12,800	1,536	1,884,750	203,422
Spanish mackerel					6,354	508		
Spot			34,900	1,396	51,615	1,938	3,000	120
Squeteagues or "sea trout":								
Gray			39,640	1,958	3,229,534	100,537	289,600	10,160
Spotted			13,000	1,300				
Striped bass	7,240	734			5,927	780	48,800	5,200
Sturgeon			230	46				
Thimble-eyed mackerel					24,092	967		
White perch	2,200	88						
Crabs:								
Hard			1,008,000	15,120	976,960	12,146	6,500,500	79,196
Soft							279,600	14,070
Squid			875	17	145,438	4,363		
Clams, hard, public					85,256	27,044		
Oysters:								
Market, public, spring			196,000	14,000	1,750	140	92,981	8,900
Market, public, fall					3,850	300	281,757	27,021
Market, private, spring			315,000	22,500	99,743	5,960	20,069	2,103
Market, private, fall			945,000	67,500	193,886	11,620	60,613	6,343
Seed, public, spring			84,830	2,544				
Seed, public, fall			169,670	5,090				
Seed, private, spring					45,000	1,080		
Scallops, bay					517,278	34,485		
Total	93,040	8,594	3,144,885	152,185	7,856,178	294,993	109,655,560	762,960

Species	Prince George		Princess Anne		Prince William		Richmond		Spotsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	10,000	$148			8,000	$150	61,650	$924	8,000	$100
Bluefish			5,000	$400						
Butterfish			22,000	880						
Carp	38,138	1,525					4,500	180		
Catfish and bullheads	65,404	3,259			102,400	4,096	12,300	615	37,000	1,480
Croaker			106,000	3,180			27,000	810		
Eels	600	24					1,450	58		
Flounders	400	20	10,000	400						
Hickory shad							525	20		
Shad	9,235	1,373	51,000	7,650	88,189	6,760	14,650	2,197	24,300	2,490
Spanish mackerel			200	16						
Spot			27,900	1,395			4,400	176		
Squeteagues or "sea trout":										
Gray			29,500	1,475			3,350	198		
Spotted			18,500	1,850						
Striped bass	2,124	287			30,200	5,960	2,000	300		
White perch	1,400	56			19,800	990	7,900	503	9,600	480
Yellow perch					14,600	1,022			9,000	630
Crabs, hard			594,000	11,880			7,200	108	70,000	1,050
Oysters:										
Market, public, spring							64,505	9,215		
Market, public, fall							193,515	22,116		
Market, private, spring			8,400	1,800			134,400	15,360		
Market, private, fall			19,600	4,200			403,200	46,080		
Seed, public, spring			10,000	300						
Total	127,301	6,692	902,100	35,426	263,189	18,978	942,545	98,860	157,900	6,230

Fisheries of Virginia, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Stafford		Surry		Warwick		Westmoreland		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	6,000	$135	7,500	$113	150,000	$1,500	2,266,800	$15,411	51,150	$512
Bluefish							76,800	4,608	37,700	2,662
Butterfish					33,593	1,468			290	10
Carp			17,400	522			14,400	1,000		
Catfish and bullheads	30,500	1,220	21,200	636			58,000	2,848	3,000	105
Cod					33	1			424	21
Croaker			5,100	153	85,560	1,772	34,000	510	358,153	7,728
Drum, red or redfish									6,420	257
Eels									1,000	60
Flounders					162,890	8,331			211,498	9,844
Gizzard shad			10,400	208	1,200	36				
Hake					11,772	294			1,553	33
King whiting or "kingfish"					2,093	68			6,025	194
Mullet					2,000	100				
Pigfish					53	2			29,279	1,166
Scup or porgy					86,134	4,305			3,282	87
Sea bass					15,399	771			13,206	685
Shad	19,173	1,565	34,700	4,164	130,400	19,560	199,069	22,582	88,600	11,382
Spanish mackerel									4,900	490
Spot					100	3			107,000	4,114
Squeteagues or "sea trout", gray					121,308	6,051	148,000	3,760	130,309	5,106
Striped bass	2,400	360	8,000	964	76,200	9,144	54,500	7,080	27,800	3,328
Sturgeon					241	48			1,459	197
White perch	11,200	560	4,700	188	5,407	215	20,600	1,100	63	2
Yellow perch	9,000	630					1,200	96	2,000	90
Crabs, hard					178,000	2,225	1,780,000	22,249	6,478,000	95,100
Squid					372	10			858	18
Clams, hard, public									285,520	97,183
Oysters:										
Market, public, spring					275,310	15,732	99,400	12,320	312,620	17,864
Market, public, fall					550,690	31,468	297,150	36,822	625,380	35,736
Market, private, spring					37,366	2,135			208,810	17,148
Market, private, fall					74,725	4,270	24,745	3,055	470,190	38,052
Seed, public, spring					814,300	24,429			522,465	15,674
Seed, public, fall					1,628,700	48,861			1,045,035	31,353
Total	78,273	4,470	109,000	6,948	4,443,846	182,799	5,074,664	133,441	11,033,989	396,201

FISHERIES OF THE SOUTH ATLANTIC AND GULF STATES

(South Atlantic, area XXIV; Gulf, area XXV)[6]

The yield of fishery products in the South Atlantic and Gulf States (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas) during 1931 amounted to 289,309,501 pounds, valued at $8,081,934. This is a decrease of 31 percent in the volume of the catch and 27 percent in its value as compared with the previous year. Of the total catch in 1931, 166,809,600 pounds, valued at $3,393,352, were fish and 122,499,901 pounds, valued at $4,688,582, were shellfish and miscellaneous products. These fisheries gave employment to 23,722 fishermen, or an increase of 1 percent as compared with the previous year. Of the total number of fishermen employed during 1931, 2,895 regular fishermen were engaged on vessels and 16,012 regular and 4,815 casual fishermen were employed in the boat and shore fisheries.

[6] These are the numbers given to these areas by the North American Council on Fishery Investigations.

Fisheries of the South Atlantic and Gulf States, 1931

SUMMARY OF CATCH

Product	North Carolina		South Carolina		Georgia	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	93, 332, 707	$828, 700	630, 924	$57, 295	1, 351, 042	$55, 185
Shellfish, etc	4, 828, 611	258, 858	5, 205, 988	154, 162	5, 998, 771	195, 953
Total	98, 161, 318	1, 087, 558	5, 836, 912	211, 457	7, 349, 813	251, 138

Product	Florida		Alabama		Mississippi	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	61, 264, 350	$1, 902, 082	2, 842, 702	$127, 026	1, 372, 865	$49, 452
Shellfish, etc	22, 789, 496	1, 691, 380	3, 325, 098	95, 746	21, 612, 457	545, 921
Total	84, 053, 846	3, 593, 462	6, 167, 800	222, 772	22, 985, 322	595, 373

Product	Louisiana		Texas		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	1, 810, 321	$102, 310	4, 204, 689	$271, 302	166, 809, 600	$3, 393, 352
Shellfish, etc	43, 893, 320	1, 228, 024	14, 846, 160	518, 538	122, 499, 901	4, 688, 582
Total	45, 703, 641	1, 330, 334	19, 050, 849	789, 840	289, 309, 501	8, 081, 934

OPERATING UNITS: BY STATES

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	960	39	82	826	134	485	214	155	2, 895
On boats and shore:									
Regular	2, 863	871	428	6, 375	450	1, 015	2, 618	1, 392	16, 012
Casual	1, 425	806	498	1, 156	71	213	254	392	4, 815
Total	5, 248	1, 716	1, 008	8, 357	655	1, 713	3, 086	1, 939	23, 722
Vessels:									
Steam			1						1
Net tonnage			65						65
Motor	95	12	26	115	28	127	85	41	529
Net tonnage	1, 754	170	211	3, 272	322	1, 683	620	454	8, 486
Sail	60			4		5	4		73
Net tonnage	555			249		70	62		936
Total vessels	155	12	27	119	28	132	89	41	603
Total net tonnage	2, 309	170	276	3, 521	322	1, 753	682	454	9, 487
Boats:									
Motor	1, 326	104	149	2, 401	175	327	928	444	5, 854
Other	1, 563	989	486	3, 295	188	499	1, 074	489	8, 583
Accessory boats	93	80		2					175
Apparatus:									
Purse seines:									
Menhaden	43		1	5					49
Length, yards	10, 745		300	1, 440					12, 485
Other	1			1					2
Length, yards	175			300					475
Haul seines:									
Common	474	21	13	123	6	18	143	59	857
Length, yards	71, 696	2, 830	1, 430	43, 660	3, 900	4, 045	17, 995	10, 000	155, 556
Long	58			73					131
Length, yards	54, 800			63, 400					118, 200
Gill nets:									
Anchor	1, 882	365	14	12					2, 273
Square yards	1, 018, 380	131, 100	3, 800	9, 600					1, 162, 880
Drift	348	502	118	115					1, 083
Square yards	401, 649	447, 501	54, 700	167, 650					1, 071, 500
Runaround	205	7	8	2, 537				102	2, 859
Square yards	94, 300	1, 800	2, 460	2, 789, 002				23, 279	2, 910, 841
Stake	7, 314		85	3	22			391	7, 815
Square yards	674, 235		46, 230	1, 500	3, 500			97, 172	822, 637
Trammel nets				187	65	46	61	81	440
Square yards				117, 875	21, 063	15, 353	16, 050	27, 003	197, 344

Fisheries of the South Atlantic and Gulf States, 1931—Continued

OPERATING UNITS: By States—Continued

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Apparatus—Continued	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Lines:									
Hand	76	160		1,702	141	162	156	461	2,858
Hooks	302	520		2,913	249	188	161	667	5,000
Troll	21			1,241	2			6	1,270
Hooks	21			1,649	2			6	1,678
Trot with baits or snoods	206	6	23	5	18	47	333	29	667
Baits or snoods	159,750	4,500	7,100	840	3,025	11,996	69,060	3,670	259,941
Trot with hooks	6		80	266	182		3	34	571
Hooks	1,200		5,050	117,100	18,550		300	4,970	147,170
Pound nets	2,257			25					2,282
Weirs	2								2
Wheels	24								24
Stop nets				8					8
Square yards				12,500					12,500
Fyke nets	950		40	50	122				1,162
Dip nets:									
Common	194			64					258
Drop				48		138	1,715		1,901
Cast nets			12	18		60	16		106
Otter trawls:									
Fish	4								4
Yards at mouth	74								74
Shrimp	39	60	165	383	137	335	838	294	2,251
Yards at mouth	727	1,260	3,300	7,121	1,778	4,226	10,720	4,318	33,450
Pots:									
Crab			10	1,443					1,453
Eel	1,276			45					1,321
Fish				4,240					4,240
Sea crawfish				2,073					2,073
Spears	30	6		40	87	65		168	336
Dredges:									
Clam				1					1
Crab	115								115
Yards at mouth	143								143
Oyster	210	1				314	36	30	591
Yards at mouth	213	1				315	36	29	594
Scallop	199			2					201
Yards at mouth	199			2					201
Tongs	487	6	194	449	131	308	506	253	2,334
Rakes	575		6	8					589
Forks				47					47
Grabs		407	20						427
Coquina scoops				2					2
Hooks, sponge				302					302
Diving apparatus				55					55

CATCH: By States

Species	North Carolina		South Carolina		Georgia	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7,993,550	$80,723				
Black bass	57,872	5,786				
Bluefish	676,450	17,501	2,180	$87		
Bowfin	9,650	96				
Butterfish	303,700	5,173				
Carp	260,200	15,351				
Catfish and bullheads	289,900	11,196			185,000	$10,650
Cero	5,000	400				
Croaker	4,310,100	56,796			8,500	170
Drum, red or redfish	85,400	2,387	1,500	75	4,000	160
Eels	113,700	6,672				
Flounders	1,013,800	76,182	4,400	295	10,000	300
Gizzard shad	34,300	343				
Harvestfish or "starfish"	48,400	968				
Hickory shad	192,100	5,877	5,653	565	14,000	1,020
King whiting or "kingfish"	181,100	5,396	15,700	1,257	35,000	1,440
Menhaden	67,877,400	94,196			869,048	2,463
Mullet	2,123,650	43,952	240,000	12,000	76,500	4,185
Pigfish	25,300	263				
Pike or pickerel	6,450	506				
Pinfish or sailors choice	20,800	216				
Pompano	100	20				
Porgies	500	15				

Fisheries of the South Atlantic and Gulf States, 1931—Continued

CATCH: BY STATES—Continued

Species	North Carolina		South Carolina		Georgia	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sea bass	157,000	$5,910	150,000	$6,450	1,000	$40
Shad	883,375	139,409	151,556	30,311	132,294	33,073
Sharks			5,000	100		
Sheepshead	3,700	160				
Snapper, red	1,500	30				
Spanish mackerel	84,250	6,332				
Spot	1,715,400	25,754	9,000	270	3,700	104
Squeteagues or "sea trout":						
Gray	2,994,200	103,926	3,500	240		
Spotted	1,108,350	65,537	15,000	1,320	10,000	880
Striped bass	326,510	34,526				
Sturgeon	1,000	240	27,435	4,325	2,000	700
Suckers	9,300	186				
Sunfish	7,900	160				
White perch	327,650	13,025				
Yellow perch	83,150	3,490				
Total	93,332,707	828,700	630,924	57,295	1,351,042	55,185
SHELLFISH, ETC.						
Crabs:						
Hard [1]	1,851,829	25,211	20,000	600	209,250	3,139
Soft	310,594	46,586				
Shrimp	338,273	13,975	2,635,336	91,167	5,471,063	180,583
Clams, hard, public [2]	332,344	30,775			1,200	150
Oysters: [3]						
Market, public, spring	894,041	55,037	910,359	22,948		
Market, public, fall	606,530	37,024	545,351	10,826		
Market, private, spring			752,189	17,797	210,714	4,640
Market, private, fall			331,903	9,105	97,052	4,611
Scallops, bay	495,000	50,250				
Octopus			5,000	500		
Terrapin, diamond-back			5,850	1,219	9,492	2,830
Total	4,828,611	258,858	5,205,988	154,162	5,998,771	195,953
Grand total	98,161,318	1,087,558	5,836,912	211,457	7,349,813	251,138

Species	Florida		Alabama		Mississippi	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	320,586	$1,606				
Amberjack	6,420	194				
Barracuda	18,720	749				
Black bass	423,559	38,967				
Bluefish	1,208,255	63,679	34,875	$1,518	18,358	$834
Blue runner or hardtail	220,057	7,287	3,040	55		
Bonito	550	8				
Buffalofish			44,806	2,037	9,196	502
Cabio or crab eater	9,513	226	550	15	385	14
Catfish and bullheads	3,449,427	146,017	142,773	6,489	52,462	2,008
Cero	2,310	84				
Cigarfish	35,840	819				
Crappie	489,721	17,516				
Crevalle	69,573	1,591	4,995	91	5,793	106
Croaker	46,665	882	40,871	748	11,941	326
Drum:						
Black	27,919	531	2,446	51	15,720	432
Red or redfish	1,049,393	21,320	61,826	2,084	99,518	3,618
Eels	3,344	142				
Flounders	87,138	3,202	32,041	2,205	61,171	3,929
Groupers	2,612,515	68,050	107,876	3,039	24,092	623
Grunts	20,574	451	118	4		
Hickory shad	25,248	758				

[1] Statistics on hard crabs used in this table are based on yields of 3 pounds per dozen in North Carolina, South Carolina, and Georgia; 4.104 pounds in Florida; 7 pounds in Alabama, Mississippi, and Texas; and 6 pounds in Louisiana.

[2] Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel in all States.

[3] Statistics on market oysters used in this table are based on yields of 5.97 pounds of meats per bushel in North Carolina, 5.07 in South Carolina, 6.24 in Georgia, 3.46 in Florida, 2.55 in Alabama, 2.53 in Mississippi, 3.92 in Louisiana, and 5.18 in Texas.

Fisheries of the South Atlantic and Gulf States, 1931—Continued

CATCH: BY STATES—Continued

Species	Florida		Alabama		Mississippi	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Jewfish	9,564	$254			690	$17
Kingfish or "king mackerel"	3,414,904	164,234	1,320	$60		
King whiting or "kingfish"	206,375	5,549	10,819	281	6,404	175
Ladyfish	2,878	57				
Menhaden	8,156,040	21,139	3,548	71		
Mojarro	71,806	1,610				
Mullet	22,349,788	420,031	1,316,274	37,524	746,095	19,381
Muttonfish	35,664	1,303				
Paddlefish or spoonbill cat			2,403	109		
Permit	4,730	60				
Pigfish	60,296	1,124				
Pinfish or sailors choice	46,058	1,197				
Pompano	557,539	101,784	5,181	708	521	72
Porgies	46,010	1,125				
Sea bass	103,217	5,025				
Shad	620,875	83,675				
Sharks	925,000	2,960	20,000	75		
Sheepshead	840,769	14,601	5,222	192	32,062	1,168
Snapper:						
Mangrove	114,460	3,201				
Red	4,504,850	298,474	863,201	60,430	68,236	4,777
Snook or sergeantfish	263,758	5,860				
Spadefish	533	10				
Spanish mackerel	4,835,414	198,192	12,953	470	1,303	40
Spot	131,727	2,838	783	20		
Squeteagues or "sea trout":						
Gray	23,734	1,085	7,728	256	95,713	2,612
Spotted	2,982,912	164,479	101,533	6,972	120,296	8,748
Sturgeon	14,734	1,086	15,134	1,513		
Sunfish	591,325	17,714				
Tenpounder	116,221	2,585	315	6	2,425	48
Tripletail	1,708	32	71	3	484	22
Turbot	340	3				
Yellowtail	103,794	6,716				
Total	61,264,350	1,902,082	2,842,702	127,026	1,372,865	49,452
SHELLFISH, ETC.						
Crabs:						
Hard [1]	60,535	2,823	78,358	1,062	454,381	7,076
Soft			1,164	254	4,592	1,228
Stone	142,837	9,589				
Sea crawfish or spiny lobster	455,907	41,530				
Shrimp	18,852,822	682,658	2,475,200	65,676	17,715,590	393,774
Clams:						
Coquina	5,740	48				
Hard, public [2]	794,320	35,785				
Conchs	3,500	280				
Oysters: [3]						
Market, public, spring	683,895	44,993	521,307	18,236	2,679,761	110,798
Market, public, fall	799,975	58,699	224,498	8,622	758,133	33,045
Market, private, spring	146,260	8,856	3,536	260		
Market, private, fall	118,646	9,506	19,380	1,140		
Scallops, bay	13,526	924				
Frogs	104,336	12,520				
Terrapin, diamond-back			1,655	496		
Turtles:						
Green	31,086	1,896				
Soft-shell	14,690	233				
Sponges:						
Grass	118,580	26,127				
Sheepswool	311,960	701,168				
Velvet	190	99				
Wire	12,514	4,986				
Yellow	118,177	48,660				
Total	22,789,496	1,691,380	3,325,098	95,746	21,612,457	545,921
Grand total	84,053,846	3,593,462	6,167,800	222,772	22,985,322	595,373

[1] Statistics on hard crabs used in this table are based on yields of 3 pounds per dozen in North Carolina, South Carolina, and Georgia; 4.104 pounds in Florida; 7 pounds in Alabama, Mississippi, and Texas; and 6 pounds in Louisiana.

[2] Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel in all States

[3] Statistics on market oysters used in this table are based on yields of 5.97 pounds of meats per bushel in North Carolina, 5.07 in South Carolina, 6.24 in Georgia, 3.46 in Florida, 2.55 in Alabama, 2.53 in Mississippi, 3.92 in Louisiana, and 5.18 in Texas.

Fisheries of the South Atlantic and Gulf States, 1931—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					8,314,136	$82,329
Amberjack					6,420	194
Barracuda					18,720	749
Black bass					481,431	44,753
Bluefish			2,640	$144	1,942,758	83,763
Blue runner or hardtail					223,097	7,342
Bonito					550	8
Bowfin					9,650	96
Buffalofish					54,002	2,539
Butterfish					303,700	5,173
Cabio or crab eater					10,445	255
Carp					260,200	15,351
Catfish and bullheads	83,630	$2,193	94,682	3,469	4,297,874	182,022
Cero					7,310	484
Cigarfish					35,840	819
Crappie					489,721	17,516
Crevalle	150	9	385	7	80,896	1,804
Croaker	58,830	3,216	34,275	1,246	4,511,182	63,384
Drum:						
Black	179,166	5,457	1,136,120	32,162	1,361,371	38,633
Red or redfish	369,443	22,322	863,539	63,214	2,534,619	115,180
Eels					117,044	6,814
Flounders	28,935	2,158	74,745	6,995	1,312,230	95,266
Garfish	500	40			500	40
Gizzard shad					34,300	343
Groupers	4,170	125	45,831	1,367	2,794,484	73,204
Grunts					20,692	455
Harvestfish or "starfish"					48,400	968
Hickory shad					237,001	8,220
Jewfish	7,050	212	275	8	17,579	491
Kingfish or "king mackerel"			3,740	136	3,419,964	164,430
King whiting or "kingfish"	54,710	1,160	14,795	538	524,903	15,796
Ladyfish					2,878	57
Menhaden					76,906,036	117,869
Mojarro					71,806	1,610
Mullet	6,390	199	6,100	189	26,864,797	537,461
Muttonfish					35,664	1,303
Paddlefish or spoonbill cat					2,403	109
Permit					4,730	60
Pigfish					85,596	1,387
Pike or pickerel					6,450	506
Pinfish or sailors choice					66,858	1,413
Pompano	1,049	138	8,558	1,167	572,948	103,889
Porgies					46,510	1,140
Sea bass					411,217	17,425
Shad					1,788,100	286,468
Sharks	20,000	125			970,000	3,260
Sheepshead	133,618	7,749	46,967	2,411	1,062,338	26,281
Snapper:						
Mangrove					114,460	3,201
Red	78,835	5,518	690,664	55,252	6,207,286	424,481
Snook or sergeantfish			34,430	1,254	298,188	7,114
Spadefish					533	10
Spanish mackerel	900	36	63,205	2,361	4,998,025	207,431
Spot	10,475	309			1,871,085	29,295
Squeteagues or "sea trout":						
Gray	307,555	6,215			3,432,430	114,334
Spotted	459,615	44,847	1,083,738	99,382	5,881,444	392,165
Striped bass					326,510	34,526
Sturgeon					60,303	7,864
Suckers					9,300	186
Sunfish					599,225	17,874
Tenpounder					118,961	2,639
Tripletail	5,300	282			7,563	339
Turbot					340	3
White perch					327,650	13,025
Yellow perch					83,150	3,490
Yellowtail					103,794	6,716
Total	1,810,321	102,310	4,204,689	271,302	166,809,600	3,393,352

Fisheries of the South Atlantic and Gulf States, 1931—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
SHELLFISH, ETC.						
Crabs:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Hard [1]	4,985,280	$52,859	49,455	$1,015	7,709,088	$93,785
Soft	120,784	45,292			437,134	93,360
Stone					142,837	9,589
Sea crawfish or spiny lobster					455,907	41,530
Shrimp	35,148,226	844,061	13,814,373	458,152	96,450,883	2,730,046
Clams:						
Coquina					5,740	48
Hard, public [2]					1,127,864	66,710
Conchs					3,500	280
Oysters: [3]						
Market, public, spring	268,092	12,863	405,627	26,762	6,363,082	291,637
Market, public, fall	222,996	10,863	576,705	32,609	3,734,188	191,688
Market, private, spring	1,692,337	138,880			2,805,036	170,433
Market, private, fall	1,406,473	116,260			1,973,454	140,622
Scallops, bay					508,526	51,174
Octopus					5,000	500
Frogs					104,336	12,520
Terrapin, diamond-back	21,312	6,390			38,309	10,935
Turtles:						
Green					31,086	1,896
Loggerhead	27,820	556			27,820	556
Soft-shell					14,690	233
Sponges:						
Grass					118,580	26,127
Sheepswool					311,960	701,168
Velvet					190	99
Wire					12,514	4,986
Yellow					118,177	48,660
Total	43,893,320	1,228,024	14,846,160	518,538	122,499,901	4,688,582
Grand total	45,703,641	1,330,334	19,050,849	789,840	289,309,501	8,081,934

[1] Statistics on hard crabs used in this table are based on yields of 3 pounds per dozen in North Carolina, South Carolina, and Georgia; 4.104 pounds in Florida; 7 pounds in Alabama, Mississippi, and Texas; and 6 pounds in Louisiana.

[2] Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel in all States.

[3] Statistics on market oysters used in this table are based on yields of 5.97 pounds of meats per bushel in North Carolina, 5.07 in South Carolina, 6.24 in Georgia, 3.46 in Florida, 2.55 in Alabama, 2.53 in Mississippi, 3.92 in Louisiana, and 5.18 in Texas.

PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	North Carolina		South Carolina		Georgia	
Crabs:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Hard—number	7,407,316	$25,211	80,000	$600	837,000	$3,139
Soft—do	1,242,376	46,586				
Clams, hard, public—bushels	41,543	30,775			150	150
Oysters:						
Market, public, spring—do	149,756	55,037	179,558	22,948		
Market, public, fall—do	101,596	37,024	107,564	10,826		
Market, private, spring—do			148,361	17,797	33,768	4,640
Market, private, fall—do			65,464	9,105	15,553	4,611
Scallops, bay—do	90,000	50,250				

Product	Florida		Alabama		Mississippi	
Crabs:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Hard—number	177,004	$2,823	134,384	$1,062	779,263	$7,076
Soft—do			3,492	254	13,776	1,228
Clams, hard, public—bushels	99,290	35,785				
Oysters:						
Market, public, spring—do	197,657	44,993	204,434	18,236	1,059,194	110,798
Market, public, fall—do	231,207	58,699	88,038	8,622	299,657	33,045
Market, private, spring—do	42,272	8,856	1,387	260		
Market, private, fall—do	34,291	9,506	7,600	1,140		
Scallops, bay—do	2,552	924				

Fisheries of the South Atlantic and Gulf States, 1931—Continued

PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS—Continued

Product	Louisiana		Texas		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard, number	9,970,560	$52,859	84,815	$1,015	19,470,342	$93,785
Soft, do	362,352	45,292			1,621,996	93,360
Clams, hard, public, bushels					140,983	66,710
Oysters:						
Market, public, spring, do	68,391	12,863	78,306	26,762	1,937,296	291,637
Market, public, fall, do	56,887	10,863	111,333	32,609	996,282	191,688
Market, private, spring, do	431,719	138,880			657,507	170,433
Market, private, fall, do	358,794	116,260			481,702	140,622
Scallops, bay, do					92,552	51,174

Industries related to the fisheries of the South Atlantic and Gulf States, 1931

OPERATING UNITS, SALARIES, AND WAGES

Item	North Carolina	South Carolina	Georgia	Florida	Alabama
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	60	85	8	43	9
On boats	4	39		73	2
Total	64	124	8	116	11
Vessels:					
Motor	37	9	4	22	8
Net tonnage	342	101	26	318	68
Sail		29		1	
Net tonnage		263		16	
Total vessels	37	38	4	23	8
Total net tonnage	342	364	26	334	68
Boats	2	41		72	1
Wholesale and manufacturing:					
Establishments	64	28	35	250	20
Persons engaged:					
Proprietors	70	23	34	311	27
Salaried employees	25	24	22	105	16
Wage earners:					
Average for season	669	763	1,198	2,447	352
Average for year	265	269	273	927	183
Paid to salaried employees	$33,112	$58,986	$64,047	$257,707	$41,238
Paid to wage earners	146,855	109,845	137,498	561,198	59,919
Total salaries and wages	179,967	168,831	201,545	818,905	101,157
Fishermen manufacturing	729	10	17	254	46

Item	Mississippi	Louisiana	Texas	Total
Transporting:				
Persons engaged:	*Number*	*Number*	*Number*	*Number*
On vessels		147	2	354
On boats	16	255		389
Total	16	402	2	743
Vessels:				
Motor		71	1	152
Net tonnage		579	6	1,440
Sail				30
Net tonnage				279
Total vessels		71	1	182
Total net tonnage		579	6	1,719
Boats	8	127		251
Wholesale and manufacturing:				
Establishments	46	90	52	585
Persons engaged:				
Proprietors	62	112	61	700
Salaried employees	31	96	33	352
Wage earners:				
Average for season	2,286	3,287	1,581	12,583
Average for year	968	1,280	416	4,581
Paid to salaried employees	$82,525	$202,958	$45,430	$786,003
Paid to wage earners	301,101	541,074	178,050	2,035,540
Total salaries and wages	383,626	744,032	223,480	2,821,543
Fishermen manufacturing	86	10	227	1,379

Industries related to the fisheries of the South Atlantic and Gulf States, 1931—Con.

PRODUCTS MANUFACTURED

Item	North Carolina		South Carolina		Georgia		Florida	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Alewife roe, canned standard cases	3,574	$13,393						
Groupers:								
Frozen fillets pounds							18,000	$2,880
Frozen steaks do							130,000	18,420
Menhaden products:								
Acid scrap tons	865	14,449	(1)	(1)	(1)	(1)	1,419	27,763
Dry scrap do	1,951	59,075	(1)	(1)			3,580	116,081
Fish meal do	456	21,367					1,254	45,276
Oil gallons	291,559	42,365	(1)	(1)	(1)	(1)	209,079	32,307
Mullet:								
Frozen fillets pounds							19,000	2,800
Salted do	278,000	11,335					320,167	12,754
Roe, salted do							30,590	6,485
Snapper, red:								
Frozen fillets do							51,500	11,375
Frozen steaks do							36,193	6,241
Spanish mackerel, frozen fillets pounds							15,500	3,140
Squeteagues, frozen fillets pounds							16,000	5,400
Crab meat, packaged do	188,032	33,748			18,250	$5,844	(1)	(1)
Shrimp:								
Cooked and peeled do					(1)	(1)		
Canned standard cases			(1)	(1)	67,704	390,624	48,193	312,932
Clams, hard, juice and broth, canned standard cases					(1)	(1)	7,147	32,878
Marine-shell novelties								8,375
Oysters:								
Fresh-shucked gallons	119,238	111,350	20,514	$21,668	23,467	25,897	113,629	142,827
Canned standard cases	(1)	(1)	74,186	224,248	(1)	(1)		
Shell products:								
Poultry feed tons	1,675	7,962	9,310	85,261			28,722	152,553
Lime do	(1)	(1)	(1)	(1)			1,019	1,571
Unclassified products:								
Steaks and fillets pounds	(2)	(2)					[3] 53,415	[3] 10,981
Canned standard cases	(2)	(2)	(2)	(2)	[4] 3,526	[4] 12,562	[5] 28,942	[5] 188,316
Novelties								22,100
Miscellaneous		[6] 13,222		[7] 86,033		[8] 43,280		[9] 13,081
Total		328,266		417,210		478,207		1,176,536
By fishermen:								
Alewives:								
Corned pounds	2,562,600	34,975						
Tight-pack cut do	23,100	847						
Tight-pack roe do	182,000	7,862						
Smoked do	6,000	450						
Mullet, salted do	110,000	4,900					475,195	18,793
Mullet, roe, salted do							44,114	10,865
Spot, salted do	25,000	1,125						
Sturgeon caviar do			312	156			12	10
Crab meat, packaged do							1,000	500
Clams, hard, fresh-shucked gallons	200	300						
Oysters, fresh-shucked do	15,150	12,120	1,139	1,159	5,648	5,648	27,915	35,870
Scallops, bay, fresh-shucked gallons	55,000	56,250					1,265	1,305
Total		118,829		1,315		5,648		67,343
Grand total		447,095		418,525		483,855		1,243,879

For footnotes see p. 274.

Industries related to the fisheries of the South Atlantic and Gulf States, 1931—Con.

PRODUCTS MANUFACTURED—Continued

Item	Alabama		Mississippi		Louisiana		Texas	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Mullet, salted—pounds			[1]	[1]				
Snapper, red:								
Frozen fillets—do	[1]	[1]						
Frozen steaks—do	[1]	[1]						
Squeteagues, frozen fillets—pounds	[1]	[1]					[1]	[1]
Crab meat, packaged—do			22,500	$5,825	174,550	$47,184	[1]	[1]
Shrimp:								
Packaged, headless, fresh—pounds							1,874,000	$262,960
Sun-dried—do					1,333,568	302,041		
Cooked and peeled—do			326,550	81,638				
Canned, standard cases	[1]	[1]	201,959	791,953	364,569	1,778,619	81,689	443,125
Meal—tons	[1]	[1]			930	16,520		
Oysters:								
Fresh-shucked—gallons	20,370	$23,424	41,436	42,198	202,015	256,882	65,294	74,448
Canned, standard cases	23,551	75,332	159,808	487,644	24,415	85,278		
Shell products:								
Poultry feed—tons	[1]	[1]	32,801	224,200	93,729	654,027	[1]	[1]
Lime—do	[1]	[1]	1,855	1,000	4,421	13,198	[1]	[1]
Unclassified products:								
Canned, standard cases	[2]	[2]	[2]	[2]				
Miscellaneous		[10] 253,460		[11] 4,160		[12] 6,366		[13] 42,887
Total		352,216		1,638,618		3,160,115		823,420
By fishermen:								
Crab meat, packaged—pounds							460	115
Shrimp:								
Sun-dried—do					13,900	2,780		
Meal—tons					7	105		
Oysters, fresh-shucked—gallons	6,289	6,747	17,133	16,205			46,151	39,718
Total		6,747		16,205		2,885		39,833
Grand total		358,963		1,654,823		3,163,000		863,253

[1] This item has been included under unclassified products.
[2] This item has been included under miscellaneous.
[3] Includes frozen pandressed pinfish, pompano, mangrove snapper, sheepshead, and squeteague; fresh steaks of red drum, grouper, and red snapper; frozen steaks of cabio, red drum, snook and tripletail; fresh fillets of red snapper; and frozen fillets of amberjack, bluefish, jewfish, and snook.
[4] Includes canned oysters, terrapin meat and soup, and whole hard clams.
[5] Includes canned whole, chowder, and minced hard clams; oysters; and turtle meat and soup.
[6] Includes fresh fillets of gray squeteague, salted spot, fresh-shucked hard clams, canned oysters, and oyster-shell lime.
[7] Includes canned shrimp, oyster-shell lime, and menhaden products.
[8] Includes cooked shrimp, fresh-shucked hard clams and menhaden products.
[9] Includes salted bluefish and Spanish mackerel; frozen packaged mullet roe; crab meat; fresh-shucked conchs, hard clams, and bay scallops; shark hides and oil; and miscellaneous meal and oil.
[10] Includes frozen fillets of red snapper and squeteague, frozen steaks of red snapper, canned shrimp, shrimp bran, oyster-shell products, and shark hides.
[11] Includes salted mullet and creole gumbo soup.
[12] Includes sun-dried squeteague and shark hides.
[13] Includes fresh-cooked crab meat; frozen packaged shrimp, frozen fillets of red drum and squeteague; and oyster-shell products.

NOTE.—The total value of the products for the South Atlantic and Gulf States was as follows: By manufacturing establishments, $8,374,588; and by fishermen, $258,805. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 1,098 have also been included as fishermen and 391 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

NORTH CAROLINA

Fisheries of North Carolina, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines		Gill nets			
	Menhaden	Other	Common	Long	Anchor	Drift	Runaround	Stake
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	601	-------	21	126	34	-------	-------	-------
On boats and shore:								
Regular	48	7	846	137	342	318	107	286
Casual	-------	-------	431	12	72	14	115	92
Total	649	7	1,298	275	448	332	222	378
Vessels:								
Motor	37	-------	7	36	12	-------	-------	-------
Net tonnage	1,291	-------	45	247	73	-------	-------	-------
Boats:								
Motor	6	1	236	49	185	121	44	194
Other	10	2	445	46	136	64	108	94
Accessory boats	75	-------	2	11	-------	-------	-------	-------
Apparatus:								
Number	43	1	474	58	1,882	348	205	7,314
Length, yards	10,745	175	71,696	54,800	-------	-------	-------	-------
Square yards	-------	-------	-------	-------	1,018,380	401,649	94,300	674,235

Item	Lines				Pound nets	Weirs	Wheels	Fyke nets	Dip nets	Otter trawls	
	Hand	Troll	Trot with baits or snoods	Trot with hooks						Fish	Shrimp
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	15	8	-------	-------	-------	-------	-------	-------	-------	12	13
On boats and shore:											
Regular	-------	15	148	6	456	1	6	43	120	-------	66
Casual	20	-------	73	-------	231	-------	-------	12	74	-------	-------
Total	35	23	221	6	687	1	6	55	194	12	79
Vessels:											
Motor	5	3	-------	-------	-------	-------	-------	-------	-------	4	6
Net tonnage	35	19	-------	-------	-------	-------	-------	-------	-------	70	46
Boats:											
Motor	10	15	115	-------	265	1	6	34	10	-------	33
Other	-------	-------	63	3	236	-------	10	24	131	-------	-------
Accessory boats	5	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Apparatus:											
Number	76	21	206	6	2,257	2	24	950	194	4	39
Yards at mouth	-------	-------	-------	-------	-------	-------	-------	-------	-------	74	727
Hooks, baits or snoods	302	21	159,750	1,200	-------	-------	-------	-------	-------	-------	-------

Fisheries of North Carolina, 1931—Continued

OPERATING UNITS: By gear—Continued

Item	Pots, eel	Spears	Dredges			Tongs	Rakes	By hand	Total, exclusive of duplication
			Crab	Oyster	Scallop				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels				187					960
On boats and shore:									
Regular	30		75	68	237	236	270		2,863
Casual	16	30		20	15	256	325	36	1,425
Total	46	30	75	275	252	492	595	36	5,248
Vessels:									
Motor				4					95
Net tonnage				46					1,754
Sail				60					60
Net tonnage				555					555
Total vessels				64					155
Total net tonnage				601					2,309
Boats:									
Motor	12		71	44	124	127	19		1,326
Other	34	30				302	383	36	1,563
Accessory boats									93
Apparatus:									
Number	1,276	30	115	210	199	487	575		
Yards at mouth			143	213	199				

CATCH: By gear

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					2,112,200	$21,144	118,800	$1,211
Black bass					46,348	4,634	3,881	388
Bluefish					234,250	6,045	171,000	4,400
Bowfin					2,950	29	1,300	13
Butterfish					4,100	61		
Carp					118,750	7,967	39,000	2,640
Catfish and bullheads					43,000	870	31,000	770
Croaker					696,500	9,035	1,158,700	12,307
Drum, red or redfish					43,500	1,324	20,200	404
Eels							200	12
Flounders					232,700	12,579	2,400	88
Gizzard shad					3,700	37	11,700	117
Harvestfish or "starfish"					3,000	60	3,000	60
Hickory shad					44,000	1,320	300	9
King whiting or "kingfish"					126,500	3,795		
Menhaden	66,857,400	$92,838			720,000	958	300,000	400
Mullet					1,084,700	20,426	1,500	67
Pigfish					19,300	193		
Pike or pickerel					4,050	324	350	28
Pinfish					20,800	216		
Pompano					100	20		
Porgies					500	15		
Sea bass					30,000	1,500		
Shad					33,500	5,050	750	112
Sheepshead					1,000	30		
Spanish mackerel					19,650	1,616		
Spot					880,600	13,319	359,000	4,890
Squeteagues or "sea trout":								
Gray					218,000	6,025	263,000	6,755
Spotted					524,300	31,916	420,000	23,630
Striped bass			5,000	$750	121,560	11,957	64,000	5,914
Sunfish					5,900	118	1,500	30
White perch					122,000	4,590	70,000	2,300
Yellow perch					27,500	1,040	8,500	416
Crabs, soft					121,913	18,256		
Total	66,857,400	92,838	5,000	750	7,666,871	186,469	3,050,081	66,961

Fisheries of North Carolina, 1931—Continued

CATCH: BY GEAR—Continued

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	477,800	$4,796	87,000	$870	5,500	$55	214,500	$2,195
Bluefish	29,000	870	47,500	1,860	3,500	70	146,200	3,196
Butterfish	1,500	22						
Carp	2,550	25						
Catfish and bullheads	4,750	220					650	20
Croaker	335,000	4,950	447,000	8,880	30,600	420	114,000	1,810
Drum, red or redfish	3,500	70	200	4			1,000	20
Eels	200	12						
Flounders	13,900	356			5,500	165	10,500	320
Gizzard shad	5,500	55						
Harvestfish or "starfish"	1,000	20						
Hickory shad	26,700	871					19,100	563
King whiting or "kingfish"	33,000	990						
Mullet	63,650	1,303	320,000	5,175	455,000	10,500	187,200	5,994
Pigfish	2,000	20	3,000	30			1,000	20
Sea bass	15,000	450			10,000	300		
Shad	216,500	31,775	13,000	1,950	3,000	400	181,075	29,103
Sheepshead					200	10		
Spanish mackerel	18,400	1,040	17,000	1,360			1,200	96
Spot	96,800	1,473	98,000	1,570	52,000	940	71,000	1,140
Squeteagues or "sea trout":								
Gray	101,400	3,042	641,300	31,989	10,000	420	153,500	6,185
Spotted	7,000	305	18,800	1,336	27,500	1,800	79,500	4,470
Striped bass	43,300	4,945			400	40	20,200	1,877
Sturgeon			1,000	240				
Suckers	4,000	80						
White perch	23,300	1,162					2,300	112
Total	1,525,750	58,852	1,693,800	55,264	603,200	15,120	1,202,925	57,121

Species	Lines							
	Hand		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			4,000	$120				
Catfish and bullheads							4,000	$200
Cero			5,000	400				
Sea bass	102,000	$3,660						
Snapper, red	1,500	30						
Spanish mackerel			14,000	1,000				
Crabs, hard					1,565,973	$19,767		
Total	103,500	3,690	23,000	1,520	1,565,973	19,767	4,000	200

Species	Pound nets		Weirs		Wheels		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	4,795,250	$48,177			135,000	$1,350	47,500	$925
Black bass							7,643	764
Bluefish	11,000	340						
Bowfin	800	8					4,600	46
Butterfish	298,100	5,090						
Carp	35,300	777	3,000	$30			61,600	3,912
Catfish and bullheads	102,200	5,110					104,300	4,006
Croaker	1,348,300	17,594						
Drum, red or redfish	17,000	565						
Eels	2,800	198					2,000	160
Flounders	652,200	60,246					11,300	352
Gizzard shad	9,100	91					4,300	43
Harvestfish or "starfish"	41,400	828						
Hickory shad	101,800	3,104					200	10
King whiting or "kingfish"	7,900	237						
Mullet	10,900	453					700	34
Pike or pickerel	500	35					1,550	119
Shad	434,950	70,929					600	90
Sheepshead	2,500	120						
Spanish mackerel	14,000	1,220						
Spot	158,000	2,422						
Squeteagues or "sea trout":								
Gray	1,584,000	48,820						
Spotted	30,750	2,045						
Striped bass	57,550	7,198					14,500	1,845
Suckers	4,900	96					400	10
Sunfish	200	6					300	6
White perch	66,750	3,262					43,300	1,599
Yellow perch	5,300	157					41,850	1,877
Total	9,793,450	279,128	3,000	30	135,000	1,350	346,643	15,798

Fisheries of North Carolina, 1931—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Otter trawls				Pots, eel	
			Fish		Shrimp			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish					30,000	$600		
Croaker			180,000	$1,800				
Eels							108,500	$6,290
Flounders			46,000	920	32,300	946		
King whiting or "kingfish"					13,700	374		
Squeteagues or "sea trout":								
Gray					23,000	690		
Spotted					500	35		
Crabs, soft	107,512	$16,155						
Shrimp					338,273	13,975		
Total	107,512	16,155	226,000	2,720	437,773	16,620	108,500	6,290

Species	Spears		Dredges					
			Crab		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	7,000	$210						
Crabs:								
Hard			272,256	$4,084				
Soft			81,169	12,175				
Oysters:								
Market, public, spring					511,871	$22,240		
Market, public, fall					380,449	18,188		
Scallops, bay							323,750	$35,028
Total	7,000	210	353,425	16,259	892,320	40,428	323,750	35,028

Species	Tongs		Rakes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard					13,600	$1,360
Clams, hard, public	11,600	$800	320,744	$29,975		
Oysters:						
Market, public, spring	336,647	28,245	164	16	45,359	4,536
Market, public, fall	197,842	16,116	1,415	141	26,824	2,579
Scallops, bay			171,250	15,222		
Total	546,089	45,161	493,573	45,354	85,783	8,475

OPERATING UNITS: BY COUNTIES

Item	Beaufort	Bertie	Brunswick	Camden	Carteret	Chowan	Craven	Currituck
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	55		122		669	3	3	
On boats and shore:								
Regular	221	19	95	8	1,137		21	282
Casual	74	14	45		254	185	71	1
Total	350	33	262	8	2,060	188	95	283
Vessels:								
Motor			10		75	1	1	
Net tonnage			319		1,317	21	5	
Sail	22				15			
Net tonnage	233				140			
Total vessels	22		10		90	1	1	
Total net tonnage	233		319		1,457	21	5	

Fisheries of North Carolina, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Beaufort	Bertie	Brunswick	Camden	Carteret	Chowan	Craven	Currituck
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	116	12	23	5	403	51	43	118
Other	83	10	48	5	439	51	31	121
Accessory boats	----	----	12	----	74	----	2	----
Apparatus:								
Purse seines:								
Menhaden	----	----	6	----	37	----	----	----
Length, yards	----	----	1,545	----	9,200	----	----	----
Haul seines:								
Common	11	----	9	----	225	----	8	102
Length, yards	4,300	----	1,200	----	17,721	----	2,000	18,875
Long	----	1	----	----	18	----	1	10
Length, yards	----	1,600	----	----	21,600	----	900	8,500
Gill nets:								
Anchor	----	----	12	80	78	150	----	140
Square yards	----	----	5,580	17,000	94,100	112,500	----	44,000
Drift	----	----	----	----	110	----	----	----
Square yards	----	----	----	----	66,269	----	----	----
Runaround	10	----	42	----	12	----	5	----
Square yards	5,500	----	14,400	----	10,656	----	2,500	----
Stake	392	----	----	----	760	----	260	100
Square yards	27,300	----	----	----	97,910	----	11,860	9,000
Lines:								
Hand	----	----	----	----	26	----	----	----
Hooks	----	----	----	----	52	----	----	----
Troll	----	----	----	----	21	----	----	----
Hooks	----	----	----	----	21	----	----	----
Trot with baits or snoods	128	----	----	----	----	----	----	----
Baits or snoods	109,750	----	----	----	----	----	----	----
Pounds nets	171	49	----	----	75	599	33	----
Wheels	----	12	----	----	----	----	----	----
Fyke nets	----	----	----	60	----	----	----	687
Dip nets	----	----	----	----	194	----	----	----
Otter trawls:								
Fish	----	----	----	----	----	1	----	----
Yards at mouth	----	----	----	----	----	20	----	----
Shrimp	----	----	15	----	24	----	----	----
Yards at mouth	----	----	255	----	472	----	----	----
Pots, eel	----	----	----	----	----	128	35	850
Dredges:								
Crab	----	----	----	----	115	----	----	----
Yards at mouth	----	----	----	----	143	----	----	----
Oyster	64	----	----	----	34	----	----	----
Yards at mouth	64	----	----	----	36	----	----	----
Scallop	----	----	----	----	199	----	----	----
Yards at mouth	----	----	----	----	199	----	----	----
Tongs	----	----	----	----	190	----	----	----
Rakes	----	----	----	----	363	----	----	----

Item	Dare	Gates	Hertford	Hyde	Lenoir	Martin	New Hanover	Onslow
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	----	----	6	----	----	----	3
On boats and shore:								
Regular	638	----	9	86	----	15	104	4
Casual	----	18	----	6	8	22	66	150
Total	641	18	9	98	8	37	170	157
Vessels:								
Motor	1	----	----	----	----	----	----	1
Net tonnage	7	----	----	----	----	----	----	8
Sail	----	----	----	2	----	----	----	----
Net tonnage	----	----	----	17	----	----	----	----
Total vessels	1	----	----	2	----	----	----	1
Total net tonnage	7	----	----	17	----	----	----	8
Boats:								
Motor	245	2	4	41	2	11	15	41
Other	177	12	4	4	3	15	90	68

Fisheries of North Carolina, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Dare	Gates	Hertford	Hyde	Lenoir	Martin	New Hanover	Onslow
Apparatus:								
Purse seines:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Other than menhaden	1							
Length, yards	175							
Haul seines:								
Common	55				2	2	18	17
Length, yards	16,500				150	800	2,000	2,200
Long	24			2				
Length, yards	19,200			1,200				
Gill nets:								
Anchor	360							12
Square yards	144,000							24,000
Drift	50	10	10	10		51	107	
Square yards	250,000	1,000	700	5,330		3,450	74,900	
Runaround	12			10			4	80
Square yards	7,200			10,000			1,444	32,600
Stake	4,594			300	7	15		
Square yards	483,700			13,800	300	600		
Lines:								
Hand								50
Hooks								250
Trot with hooks							6	
Hooks							1,200	
Pound nets	832	6	10	60				
Weirs						2		
Wheels						12		
Fyke nets		28						
Pots, eel	90					8		
Spears								20
Dredges:								
Oyster	8			46				
Yards at mouth	8			46				
Tongs	11							50
Rakes	4						50	10

Item	Pamlico	Pasquotank	Pender	Perquimans	Tyrrell	Washington
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	81	15				
On boats and shore:						
Regular	61	38	7	45	48	25
Casual	242		179		40	50
Total	384	53	186	45	88	75
Vessels:						
Motor	2	4				
Net tonnage	10	67				
Sail	20	1				
Net tonnage	154	11				
Total vessels	22	5				
Total net tonnage	164	78				
Boats:						
Motor	91	22	4	24	38	15
Other	158	24	142	24	36	18
Accessory boats	5					
Apparatus:						
Haul seines:						
Common	4		19			2
Length, yards	1,500		3,050			1,400
Long	2					
Length, yards	1,800					
Gill nets:						
Anchor		350		400	200	100
Square yards		120,000		299,200	100,000	58,000
Runaround			30			
Square yards			10,000			
Stake	226	60			600	
Square yards	5,765	2,400			21,600	
Lines:						
Trot with baits or snoods	78					
Baits or snoods	50,000					

Fisheries of North Carolina, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Pamlico	Pasquotank	Pender	Perquimans	Tyrrell	Washington
Apparatus—Continued	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Pound nets	199	25		50	96	52
Fyke nets		100			75	
Otter trawls:						
Fish		3				
Yards at mouth		54				
Pots, eel	20	30		75	40	
Spears			10			
Dredges:						
Oyster	54	4				
Yards at mouth	54	5				
Tongs	201		35			
Rakes			148			

CATCH: By counties

Species	Beaufort		Bertie		Brunswick		Camden	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	344,500	$3,445	440,000	$4,400			11,000	$110
Black bass							2,000	200
Bluefish					30,000	$600		
Bowfin							1,000	10
Butterfish	15,000	300						
Carp	17,000	85					6,000	60
Catfish and bullheads	8,000	200	700	35			2,000	100
Croaker	183,000	1,830			24,000	240		
Drum, red or redfish					600	12		
Eels							400	24
Flounders	7,500	185			32,300	946		
Gizzard shad							300	3
Hickory shad	20,000	600					300	9
King whiting or "kingfish"					15,700	434		
Menhaden					11,257,000	15,060		
Mullet	27,000	610			265,000	5,300	1,000	30
Pike or pickerel							250	20
Sea bass					25,000	750		
Shad	58,900	10,030	1,950	292	3,500	525	1,000	150
Sheepshead					200	10		
Spot	3,500	70			7,000	80		
Squeteagues or "sea trout":								
Gray	180,000	2,400			23,000	690		
Spotted	11,550	693			9,000	630		
Striped bass	23,500	1,950	1,800	180			3,000	450
White perch	4,600	230	9,250	462			6,500	325
Yellow perch	10,500	210					2,000	40
Crabs, hard	1,485,973	18,567			13,600	1,360		
Shrimp					293,868	11,755		
Oysters:								
Market, public, spring	97,125	4,836						
Market, public, fall	171,055	7,566						
Total	2,668,703	53,807	453,700	5,369	11,999,768	38,392	36,750	1,531

Species	Carteret		Chowan		Craven		Currituck	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	2,000	$30	2,059,750	$20,597	110,000	$1,100	2,800	$56
Black bass							55,872	5,586
Bluefish	208,200	5,886			19,500	390	20,000	400
Bowfin							6,350	63
Butterfish	9,600	188			25,000	500	1,000	15
Carp			2,550	25			187,400	13,930
Catfish and bullheads			41,000	2,050			97,200	1,944
Cero	5,000	400						
Croaker	1,431,000	18,415	50,000	500	270,000	2,700	27,500	275
Drum, red or redfish	31,900	638						
Eels			1,700	102	15,000	900	64,000	3,540
Flounders	21,800	539	15,300	306	41,000	1,230	10,000	400

Fisheries of North Carolina, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Carteret		Chowan		Craven		Currituck	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Gizzard shad			3,000	$30			14,600	$146
Harvestfish or "starfish"	13,000	$260						
Hickory shad	17,800	534	12,000	360	2,500	$75	3,100	93
King whiting or "kingfish"	38,000	1,140					28,000	840
Menhaden	56,620,400	79,136						
Mullet	603,200	9,059			147,000	4,410	1,400	56
Pigfish	25,300	263						
Pike or pickerel							4,900	392
Pinfish	20,800	216						
Pompano	100	20						
Sea bass	96,000	3,360						
Shad	30,200	6,040	52,000	7,800	70,000	8,187	12,200	1,830
Sheepshead	1,000	30						
Spanish mackerel	56,800	3,836					250	20
Spot	884,900	13,085			61,000	610	11,000	165
Squeteagues or "sea trout":								
Gray	479,800	13,344			220,000	5,500	15,000	425
Spotted	120,500	5,570			35,000	2,450	12,000	720
Striped bass	200	6	14,500	1,450	15,400	1,540	56,760	6,621
Suckers			4,650	92			200	4
Sunfish							7,200	144
White perch			7,500	375			156,300	4,739
Yellow perch			2,000	40			56,400	2,800
Crabs:								
Hard	272,256	4,084						
Soft	310,594	46,586						
Shrimp	44,405	2,220						
Clams, hard, public	176,112	16,512						
Oysters:								
Market, public, spring	361,290	32,378						
Market, public, fall	178,809	17,186						
Scallops, bay	495,000	50,250						
Total	62,555,966	331,211	2,265,950	33,727	1,031,400	29,592	851,432	45,204

Species	Dare		Gates		Hertford		Hyde	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	223,500	$2,255	35,000	$350	105,000	$1,050	31,500	$315
Bluefish	313,250	8,515					85,500	1,710
Bowfin	1,000	10						
Butterfish	210,600	3,533					37,000	555
Carp	30,000	1,050	350	3				
Catfish and bullheads	24,000	1,020	5,000	250				
Croaker	1,032,700	16,947					447,000	7,390
Drum, red or redfish	29,500	1,265					20,000	400
Eels	5,750	455	300	18				
Flounders	806,400	70,608					1,000	20
Gizzard shad	1,400	14						
Harvestfish or "starfish"	5,400	108					30,000	600
Hickory shad	42,200	1,326	500	15			38,000	1,140
King whiting or "kingfish"	93,400	2,802					4,000	120
Mullet	118,200	5,600					100,000	2,000
Pike or pickerel	800	59						
Shad	453,000	75,200	4,000	600	250	37	5,000	750
Sheepshead							2,000	100
Spanish mackerel	18,000	1,740					5,200	416
Spot	149,000	2,099					104,000	2,070
Squeteagues or "sea trout":								
Gray	1,448,000	64,210					223,000	8,170
Spotted	874,500	52,650					32,200	1,972
Striped bass	107,300	10,947	200	20			350	35
Sunfish	700	16						
White perch	12,500	460	2,500	125	900	45		
Yellow perch	2,700	126	150	2				
Clams, hard, public	800	100						
Oysters:								
Market, public, spring	210,966	8,068					70,715	3,620
Market, public, fall	6,145	313					73,685	3,778
Total	6,221,711	331,496	48,000	1,383	106,150	1,132	1,310,150	35,161

Fisheries of North Carolina, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Lenoir		Martin		New Hanover		Onslow	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			232,000	$2,320				
Carp			3,750	37				
Catfish and bullheads			1,500	75	4,000	$200		
Croaker					3,600	60	5,000	$70
Drum, red or redfish					400	12		
Eels			9,000	540				
Flounders					4,000	120	4,000	120
Hickory shad	1,500	$45						
King whiting or "kingfish"					2,000	60		
Mullet					235,000	3,525	163,000	3,260
Porgies					500	15		
Sea bass					30,000	1,500	6,000	300
Shad	1,000	150	600	90	10,000	1,500		
Snapper, red							1,500	30
Spanish mackerel					4,000	320		
Spot					70,000	1,400	15,000	300
Squeteagues or "sea trout":								
Gray							400	12
Spotted					800	56	2,800	196
Striped bass	1,500	75	1,500	150				
Sturgeon					1,000	240		
White perch			2,000	100				
Clams, hard, public					114,632	11,463	4,000	400
Oysters:								
Market, public, spring							6,500	250
Market, public, fall					1,431	40	8,300	375
Total	4,000	270	250,350	3,312	481,363	20,511	216,500	5,313

Species	Pamlico		Pasquotank		Pender	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	58,500	$600	71,500	$1,430		
Bowfin			500	5		
Butterfish	5,500	82				
Carp	200	8	2,400	48		
Catfish and bullheads			50,250	2,512		
Croaker	704,000	7,040	130,300	1,309	2,000	$20
Drum, red or redfish	3,000	60				
Eels	3,000	180	4,000	280		
Flounders	27,000	760	33,400	716	3,000	90
Gizzard shad			10,500	105		
Hickory shad	6,500	135	5,700	285		
Mullet	75,000	2,250	1,700	119	385,000	7,700
Pike or pickerel			500	35		
Shad	32,500	4,437	32,275	4,841		
Sheepshead	500	20				
Spot	100,000	1,225			310,000	4,650
Squeteagues or "sea trout":						
Gray	405,000	9,175				
Spotted	10,000	600				
Striped bass	2,100	210	11,600	2,212		
Suckers			200	6		
White perch			11,600	464		
Yellow perch			2,800	140		
Crabs, hard	80,000	1,200				
Clams, hard, public					36,800	2,300
Oysters:						
Market, public, spring	142,223	5,611	5,222	274		
Market, public, fall	155,203	7,257	11,902	509		
Total	1,810,226	40,850	386,349	15,290	736,800	14,760

Species	Perquimans		Tyrrell		Washington	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	190,000	$1,900	1,576,500	$15,765	2,500,000	$25,000
Bowfin	800	8				
Carp	4,050	40	6,500	65		
Catfish and bullheads	27,250	1,360	21,000	1,050	8,000	400
Eels	7,550	453	3,000	180		
Flounders	2,100	42	5,000	100		
Gizzard shad	4,500	45				
Hickory shad	14,000	420			28,000	840
Mullet	1,150	33				
Shad	95,000	14,250	8,000	1,200	12,000	1,500
Striped bass	30,000	3,000	6,000	600	50,800	5,080
Suckers	4,250	84				
White perch	50,000	2,500	12,000	600	52,000	2,600
Yellow perch	400	8	6,200	124		
Total	431,050	24,143	1,644,200	19,684	2,650,800	35,420

SOUTH CAROLINA

Fisheries of South Carolina, 1931

OPERATING UNITS: By gear

Item	Haul seines	Gill nets			Lines		Otter trawls
		Anchor	Drift	Runa-round	Hand	Trot with baits or snoods	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					10		23
On boats and shore:							
Regular	38	100	120	12	150	6	102
Casual	140	245	424				
Total	178	345	544	12	160	6	125
Vessels:							
Motor					2		9
Net tonnage					20		131
Boats:							
Motor		9	21	3	15		51
Other	21	274	333		30	6	
Apparatus:							
Number	21	365	502	7	160	6	60
Length, yards	2,830						
Square yards		131,100	447,501	1,800			
Yards at mouth							1,260
Hooks, baits or snoods					520	4,500	

Item	Spears	Dredges, oyster	Tongs	Grabs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		6				39
On boats and shore:						
Regular	6			417	34	871
Casual			6	20	16	806
Total	6	6	6	437	50	1,716
Vessels:						
Motor		1				12
Total net tonnage		19				170
Boats:						
Motor				7		104
Other	6		3	429	33	989
Apparatus:						
Number	6	1	6	407		
Yards at mouth		1				

CATCH: By gear

Species	Haul seines		Gill nets					
			Anchor		Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Drum, red or redfish	1,500	$75						
Flounders	1,400	70						
Hickory shad			4,500	$450	1,153	$115		
King whiting or "kingfish"	2,700	162					2,500	$150
Mullet	230,000	11,500					10,000	500
Shad			92,484	18,497	59,072	11,814		
Spot	5,000	150					4,000	120
Squeteagues or "sea trout":								
Gray	1,500	120						
Spotted	3,000	240						
Sturgeon			19,533	3,061	7,902	1,264		
Terrapin, diamond-back	2,958	592						
Total	248,058	12,909	116,517	22,008	68,127	13,193	16,500	770

Fisheries of South Carolina, 1931—Continued

CATCH: BY GEAR—Continued

Species	Lines				Otter trawls		Spears	
	Hand		Trot with baits or snoods					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	2,180	$87						
Flounders	500	45			1,000	$90	1,500	$90
King whiting or "kingfish"	2,500	225			8,000	720		
Octopus	5,000	500						
Sea bass	150,000	6,450						
Sharks	5,000	100						
Squeteagues or "sea trout":								
Gray	2,000	120						
Spotted	12,000	1,080						
Crabs, hard			20,000	$600				
Shrimp					2,635,336	91,167		
Total	179,180	8,607	20,000	600	2,644,336	91,977	1,500	90

Species	Dredges, oyster		Tongs		Grabs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Oyster:								
Market, public, spring					907,777	$22,846	2,582	$102
Market, public, fall					545,025	10,814	326	12
Market, private, spring	100,000	$1,660			652,189	16,137		
Market, private, fall			9,240	$1,136	322,663	7,969		
Terrapin, diamond-back							2,892	627
Total	100,000	1,660	9,240	1,136	2,427,654	57,766	5,800	741

OPERATING UNITS: BY COUNTIES

Item	Beaufort	Charleston	Colleton	Georgetown	Horry	Jasper
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		39				
On boats and shore:						
Regular	317	326		148	60	20
Casual	153	274	103	166	110	
Total	470	639	103	314	170	20
Vessels:						
Motor		12				
Net tonnage		170				
Boats:						
Motor	25	44	6	29		
Other	365	299	85	172	48	20
Apparatus:						
Haul seines	4	3		2	12	
Length, yards	280	150		400	2,000	
Gill nets:						
Anchor	65	61	139	100		
Square yards	13,000	24,400	53,700	40,000		
Drift	76	150	20	220	36	
Square yards	52,000	127,501	12,000	220,000	36,000	
Runaround				7		
Square yards				1,800		
Lines:						
Hand		160				
Hooks		520				
Trot with baits or snoods		6				
Baits or snoods		4,500				
Otter trawls	20	34		6		
Yards at mouth	400	680		180		
Spears				6		
Dredges, oyster		1				
Yards at mouth		1				
Tongs		6				
Grabs	247	140				20

Fisheries of South Carolina, 1931—Continued

CATCH: BY COUNTIES

Species	Beaufort		Charleston		Colleton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			2,180	$87		
Flounders			1,500	135		
Hickory shad	1,053	$105			4,000	$400
King whiting or "kingfish"			10,500	945		
Octopus			5,000	500		
Sea bass			150,000	6,450		
Shad	14,556	2,911	34,470	6,894	35,220	7,044
Sharks			5,000	100		
Squeteagues or "sea trout":						
Gray			2,000	120		
Spotted			12,000	1,080		
Sturgeon					8,081	1,293
Crabs, hard			20,000	600		
Shrimp	1,910,390	66,864	651,901	21,746		
Oysters:						
Market, public, spring	641,174	15,074	269,185	7,874		
Market, public, fall	370,276	6,017	174,749	4,797		
Market, private, spring	230,868	6,014	496,761	10,853		
Market, private, fall	114,652	3,216	208,388	5,577		
Terrapin, diamond-back	2,600	633	3,250	586		
Total	3,285,569	100,834	2,046,884	68,344	47,301	8,737

Species	Georgetown		Horry		Jasper	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Drum, red or redfish			1,500	$75		
Flounders	1,700	$100	1,200	60		
Hickory shad			600	60		
King whiting or "kingfish"	2,500	150	2,700	162		
Mullet	35,000	1,750	205,000	10,250		
Shad	59,880	11,976	7,430	1,486		
Spot	8,000	240	1,000	30		
Squeteagues or "sea trout":						
Gray			1,500	120		
Spotted			3,000	240		
Sturgeon	14,354	2,232	5,000	800		
Shrimp	73,045	2,557				
Oysters:						
Market, public, fall	326	12				
Market, private, spring					24,560	$930
Market, private, fall					8,863	312
Total	194,805	19,017	228,930	13,283	33,423	1,242

GEORGIA

Fisheries of Georgia, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets				Lines	
			Anchor	Drift	Runaround	Stake	Trot with baits or snoods	Trot with hooks
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	30							
On boats and shore:								
Regular		2			14	2	23	
Casual		38	22	234		41		80
Total	30	40	22	234	14	43	23	80
Vessels:								
Steam	1							
Net tonnage	65							
Boats:								
Motor					8	2		
Other		18	22	122	6	45	23	80
Apparatus:								
Number	1	13	14	118	8	85	23	80
Length, yards	300	1,430						
Square yards			3,800	54,700	2,460	46,230		
Hooks, baits, or snoods							7,100	5,050

Fisheries of Georgia, 1931—Continued

OPERATING UNITS: By gear—Continued

Item	Fyke nets	Cast nets	Otter trawls	Traps, crab	Tongs	Rakes	Grabs	By hand	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels			52						82
On boats and shore:									
Regular		2	278	10	109			41	428
Casual	20	10			85	6	20	75	498
Total	20	12	330	10	194	6	20	116	1,008
Vessels:									
Steam									1
Net tonnage									65
Motor			26						26
Net tonnage			211						211
Total vessels			26						27
Total net tonnage			211						276
Boats:									
Motor			139						149
Other	10			10	179	6	20	111	486
Apparatus:									
Number	40	12	165	10	194	6	20		
Yards at mouth			3,300						

CATCH: By gear

Species	Purse seines, menhaden		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croaker			500	$10	1,000	$80	6,800	$544
Hickory shad								
Menhaden	869,048	$2,463						
Mullet			20,000	1,400				
Shad					5,500	1,375	93,794	23,448
Spot			700	14				
Sturgeon							2,000	700
Terrapin, diamond-back			9,492	2,830				
Total	869,048	2,463	30,692	4,254	6,500	1,455	102,594	24,692

Species	Gill nets—Continued				Lines			
	Runaround		Stake		Trot with baits or snoods		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads							45,000	$2,250
Croaker	8,000	$160						
Drum, red or redfish	4,000	160						
Flounders	1,500	45						
Hickory shad			6,200	$396				
King whiting or "kingfish"	3,000	120						
Mullet	16,500	1,185						
Sea bass	1,000	40						
Shad			33,000	8,250				
Spot	3,000	90						
Squeteague or "sea trout," spotted	10,000	880						
Crabs, hard					159,250	$2,389		
Total	47,000	2,680	39,200	8,646	159,250	2,389	45,000	2,250

Fisheries of Georgia, 1931—Continued

CATCH: By gear—Continued

Species	Fyke nets		Cast nets		Otter trawls		Traps, crab	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	140,000	$8,400						
Flounders					8,500	$255		
King whiting or "kingfish"					32,000	1,320		
Mullet			40,000	$1,600				
Crabs, hard							50,000	$750
Shrimp					5,471,063	180,583		
Total	140,000	8,400	40,000	1,600	5,511,563	182,158	50,000	750

Species	Tongs		Rakes		Grabs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public			1,200	$150				
Oysters:								
Market, private, spring	111,866	$2,916			44,086	$565	54,762	$1,159
Market, private, fall	79,695	4,032					17,357	579
Total	191,561	6,948	1,200	150	44,086	565	72,119	1,738

OPERATING UNITS: By counties

Item	Bryan	Bullock	Camden	Charlton	Chatham	Glynn
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			34		16	28
On boats and shore:						
Regular			38		207	85
Casual	52	12	36	18	213	70
Total	52	12	108	18	436	183
Vessels:						
Steam			1			
Net tonnage			65			
Motor			2		8	14
Net tonnage			18		65	104
Total vessels			3		8	14
Total net tonnage			83		65	104
Boats:						
Motor			19		72	26
Other	26	6	18	9	238	65
Apparatus:						
Purse seines, menhaden			1			
Length, yards			300			
Haul seines					4	9
Length, yards					300	1,130
Gill nets:						
Anchor						8
Square yards						1,000
Drift	26	6	18	9	16	15
Square yards	14,600	2,800	5,400	2,700	9,200	4,500
Runaround					2	6
Square yards					420	2,040
Stake					60	
Square yards					42,480	
Lines:						
Trot with baits or snoods					20	3
Baits or snoods					6,000	1,100
Trot with hooks					80	
Hooks					5,050	
Cast nets					12	
Otter trawls			21		78	34
Yards at mouth			420		1,560	680
Traps, crab						10
Tongs					124	20
Rakes					6	

Fisheries of Georgia, 1931—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Liberty	McIntosh	Screven	Tattnall	Wayne
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels		4			
On boats and shore:					
Regular	18	80			
Casual		66	6	15	10
Total	18	150	6	15	10
Vessels:					
Motor		2			
Net tonnage		24			
Boats:					
Motor		30		2	
Other	18	75	6	15	10
Apparatus:					
Gill nets:					
Anchor			6		
Square yards			2,800		
Drift		18			10
Square yards		13,500			2,000
Stake				25	
Square yards				3,750	
Fyke nets		40			
Otter trawls		32			
Yards at mouth		640			
Tongs	18	32			
Grabs		20			

CATCH: BY COUNTIES

Species	Bryan		Bullock		Camden		Charlton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Hickory shad	600	$48						
Menhaden					869,048	$2,463		
Shad	24,000	6,000	4,000	$1,000	21,000	5,250	7,000	$1,750
Shrimp					922,683	32,294		
Total	24,600	6,048	4,000	1,000	1,812,731	40,007	7,000	1,750

Species	Chatham		Glynn		Liberty		McIntosh	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	45,000	$2,250					140,000	$8,400
Croaker			8,500	$170				
Drum, red or redfish			4,000	160				
Flounders	4,000	120	6,000	180				
Hickory shad	5,800	364	6,000	480			1,000	80
King whiting or "kingfish"	13,000	780	22,000	660				
Mullet	41,500	1,660	35,000	2,525				
Sea bass			1,000	40				
Shad	39,000	9,750	18,044	4,511			6,750	1,687
Spot	3,000	90	700	14				
Squeteagues or "sea trout", spotted	4,000	400	6,000	480				
Sturgeon	1,000	500					1,000	200
Crabs, hard	135,000	2,025	74,250	1,114				
Shrimp	1,574,327	55,050	1,403,330	46,117			1,570,723	47,122
Clams, hard, public	1,200	150						
Oysters:								
Market, private, spring	115,230	2,479	4,541	408	18,069	$602	72,874	1,151
Market, private, fall	35,601	1,198	752	91	32,454	1,623	28,245	1,699
Terrapin, diamond-back	1,250	537	8,242	2,293				
Total	2,018,908	77,353	1,598,359	59,243	50,523	2,225	1,820,592	60,339

Species	Screven		Tattnall		Wayne	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Hickory shad			600	$48		
Shad	2,500	$625	8,000	2,000	2,000	$500
Total	2,500	625	8,600	2,048	2,000	500

FLORIDA

Fisheries of Florida, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines		Gill nets				Trammel nets
	Menhaden	Other	Common	Long	Anchor	Drift	Run-around	Stake	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	141	10							
On boats and shore:									
Regular			595	224	6	106	2,411		222
Casual			34			51	254	3	6
Total	141	10	629	224	6	157	2,665	3	228
Vessels:									
Motor	5	1							
Net tonnage	246	11							
Boats:									
Motor			110	89	2	56	1,097		102
Other			89	146		74	1,853	3	146
Accessory boats		2							
Apparatus:									
Number	5	1	123	73	12	115	2,537	3	187
Length, yards	1,440	300	43,660	63,400					
Square yards					9,600	167,650	2,789,002	1,500	117,875

Item	Lines				Pound nets	Stop nets	Fyke nets	Dip nets	
	Hand	Troli	Trot with baits or snoods	Trot with hooks				Common	Drop
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	563								
On boats and shore:									
Regular	686	731	6	256	23	52	5	45	25
Casual	453	291		9				19	23
Total	1,702	1,022	6	265	23	52	5	64	48
Vessels:									
Motor	67								
Net tonnage	2,525								
Sail	4								
Net tonnage	249								
Total vessels	71								
Total net tonnage	2,774								
Boats:									
Motor	353	507	4	32	10	14	5	31	25
Other	384	50	2	181	9	38		43	15
Apparatus:									
Number	1,702	1,241	5	266	25	8	50	64	48
Square yards						12,500			
Hooks, baits or snoods	2,913	1,649	840	117,100					

Item	Cast nets	Otter trawls	Pots				Spears	Dredges	
			Crab	Eel	Fish	Sea crawfish		Clam	Scallop
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		112							
On boats and shore:									
Regular	6	829	33	2	107	44	7	12	3
Casual	12	8	2		5	16	33		
Total	18	949	35	2	112	60	40	12	3
Vessels:									
Motor		42							
Net tonnage		490							
Boats:									
Motor	4	341	19	2	18	36			1
Other	6		16		109	11	5		
Apparatus:									
Number	18	383	1,443	45	4,240	2,073	40	1	2
Yards at mouth		7,121							2

NOTE.—Fish pots were formerly shown as wire baskets in Franklin County and fyke nets in Lake Okeechobee.

Fisheries of Florida, 1931—Continued

OPERATING UNITS: By gear—Continued

Item	Tongs	Rakes	Forks	Coquina scoops	Hooks, sponge	Diving outfits	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels								826
On boats and shore:								
Regular	404	8	32		338	412	32	6,375
Casual	45		15	2			87	1,156
Total	449	8	47	2	338	412	119	8,357
Vessels:								
Motor								115
Net tonnage								3,272
Sail								4
Net tonnage								249
Total vessels								119
Total net tonnage								3,521
Boats:								
Motor	142		3			55		2,401
Other	177	4	12		287		26	3,295
Accessory boats								2
Apparatus:								
Number	449	8	47	2	302	55		

CATCH: By gear

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							320,256	$1,603
Black bass					9,000	$900	315,383	29,261
Bluefish					327,545	6,660	3,000	270
Blue runner or hardtail					61,798	574	800	24
Catfish and bullheads					142,594	5,659	2,249,000	95,715
Cigarfish					35,840	819		
Crappie					17,450	713	376,944	13,726
Crevalle					3,496	35	5,000	150
Croaker					6,270	75	1,200	24
Drum:								
Black					9,523	175	500	10
Red or redfish					64,670	1,553	4,088	103
Flounders					9,917	379		
Hickory shad							25,248	758
Kingfish or "king mackerel"					25,570	898		
King whiting or "kingfish"					6,564	143	600	18
Ladyfish					2,878	57		
Menhaden	8,105,380	$19,891			50,660	1,248		
Mojarro					1,600	14	20,000	600
Mullet			375,000	$7,500	2,311,485	46,868	52,641	829
Permit					880	9		
Pigfish					8,501	117	2,000	60
Pinfish or sailors choice					2,000	200	3,000	90
Pompano					34,159	5,371	4,000	120
Sea bass					275	5		
Shad					196,665	27,533	172,190	18,671
Sheepshead					45,485	832	400	16
Snapper, mangrove					4,092	47	1,500	60
Snook or sergeantfish					39,153	579	2,000	80
Spadefish					478	9		
Spanish mackerel					600,634	17,580		
Spot					4,273	71	15,408	462
Squeteagues or "sea trout":								
Gray					7,454	147		
Spotted					162,611	7,469	16,000	1,280
Sunfish					11,500	420	446,655	13,299
Tenpounder					100,714	2,403		
Turtles, soft-shell							11,690	173
Total	8,105,380	19,891	375,000	7,500	4,305,734	129,562	4,049,503	177,402

Note.—Fishpots were formerly shown as wire baskets in Franklin County and fyke nets in Lake Okeechobee.

Fisheries of Florida, 1931—Continued

CATCH: BY GEAR—Continued

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			6,818	$372	746,373	$48,955		
Blue runner or hardtail					111,082	2,231		
Cabio or crab eater					400	24		
Catfish and bullheads					54,718	1,990		
Crevalle					57,662	1,341		
Croaker					33,255	705		
Drum:								
Black					15,773	305		
Red or redfish					721,742	15,310		
Flounders					39,319	1,170		
Groupers					19,412	712		
Kingfish or "king mackerel"			500	23				
King whiting or "kingfish"			15,242	457	53,350	1,211		
Mojarro					35,500	760		
Mullet			250,000	7,500	18,043,946	330,510		
Muttonfish					18,000	490		
Permit					440	5		
Pigfish					48,495	927		
Pinfish or sailors choice					41,058	907		
Pompano			1,536	307	235,331	46,428		
Shad			228,520	33,946	22,500	3,375	1,000	$150
Sharks	925,000	$2,960						
Sheepshead					552,181	10,031		
Snapper:								
Mangrove					66,898	1,549		
Red					6,750	559		
Snook or sergeantfish					154,555	4,162		
Spadefish					55	1		
Spanish mackerel			15,132	688	4,111,976	174,888		
Spot			2,440	67	106,416	2,195		
Squeteagues or "sea trout":								
Gray			200	10	7,413	673		
Spotted			8,124	812	1,971,838	108,859		
Sturgeon			5,941	447	3,645	265		
Tenpounder					15,507	182		
Crabs, hard					1,300	13		
Turtles, green	16,500	1,167			14,586	729		
Total	941,500	4,127	534,453	44,629	27,311,376	761,462	1,000	150

Species	Trammel nets		Lines					
			Hand		Troll		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack			6,420	$194				
Barracuda			18,720	749				
Bluefish	445	$20	14,325	693	64,325	$4,653		
Blue runner or hardtail			2,325	90				
Cabio or crab eater			7,329	149				
Cero					2,310	84		
Crevalle			500	25				
Drum:								
Black	220	6	1,903	35				
Red or redfish	13,469	404	201,224	3,154				
Eels			2,200	110				
Flounders	2,002	85						
Groupers			2,591,840	67,313				
Grunts			20,574	451				
Jewfish			9,564	254				
Kingfish or "king mackerel"			1,982	99	3,362,216	162,318		
King whiting or "kingfish"	550	15	1,310	39				
Mullet	843,266	19,409						
Muttonfish			17,664	813				
Pompano	255,677	46,070	15,000	1,500				
Porgies			45,388	1,114				
Sea bass			101,942	4,970	1,000	50		
Sheepshead	9,594	278	212,993	3,172				
Snapper:								
Mangrove	2,630	72	37,085	1,439				
Red			4,498,100	297,915				

Fisheries of Florida, 1931—Continued

CATCH: BY GEAR—Continued

Species	Trammel nets		Lines					
			Hand		Troll		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Snook or sergeantfish			29,033	$528				
Spanish mackerel	594	$22	17,771	654	59,965	$3,094		
Squeteagues or "sea trout":								
Gray	660	12	7,530	231				
Spotted	129,766	6,560	582,887	34,141				
Sturgeon	5,148	374						
Tripletail			1,708	32				
Turbot			340	3				
Yellowtail			103,794	6,716				
Crabs, hard							49,165	$2,458
Total	1,264,021	73,327	8,551,451	426,583	3,489,816	170,199	49,165	2,458

Species	Lines—trot with hooks		Pound nets		Stop nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			330	$3				
Bluefish			44,489	2,022	935	$34		
Blue runner or hardtail			44,052	4,368				
Bonito					550	8		
Cabio or crab eater			1,784	53				
Catfish and bullheads	492,200	$22,407	350,000	13,750			10,000	$400
Crappie			21,786	871				
Crevalle					2,915	40		
Croaker					5,940	78		
Drum, red or redfish			16,095	439	28,105	357		
Flounders					14,522	423		
Groupers			1,263	25				
Kingfish or "king mackerel"			24,636	896				
King whiting or "kingfish"					5,759	76		
Mojarro					13,706	186		
Mullet			1,200	24	451,850	6,778		
Permit					3,410	46		
Pigfish					1,300	20		
Pompano			9,032	1,478	2,804	510		
Porgies			622	11				
Sheepshead			998	27	19,118	245		
Snapper, mangrove			330	12	1,925	22		
Snook or sergeantfish					39,017	511		
Spanish mackerel			25,602	1,164	3,740	102		
Spot					3,190	43		
Squeteagues or "sea trout":								
Gray					477	12		
Spotted			64,100	2,914	47,586	2,444		
Sunfish			22,376	671				
Turtles, soft-shell	3,000	60						
Total	495,200	22,467	628,695	28,728	646,849	11,935	10,000	400

Species	Dip nets				Cast nets		Otter trawls	
	Common		Drop					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders							6,000	$180
King whiting or "kingfish"							123,000	3,590
Mojarro					1,000	$50		
Mullet					20,500	613		
Crabs, hard			3,570	$92				
Sea crawfish or spiny lobster	119,814	$8,387	41,666	4,266				
Shrimp							18,852,822	682,658
Total	119,814	8,387	45,236	4,358	21,500	663	18,981,822	686,428

Fisheries of Florida, 1931—Continued

CATCH: BY GEAR—Continued

Species	Pots						Sea crawfish	
	Crab		Eel		Fish			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass					99,176	$8,806		
Catfish and bullheads					150,915	6,096		
Crappie					73,541	2,206		
Drum, red or redfish			976	$29				
Eels					168	3		
Sunfish					110,794	3,324		
Crabs:								
Hard	6,500	$260						
Stone	142,837	9,589						
Sea crawfish or spiny lobster							294,427	$28,877
Total	149,337	9,849	976	29	434,594	20,435	294,427	28,877

Species	Spears		Dredges				Tongs	
			Clam		Scallop			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	15,378	$965						
Frogs	52,168	6,260						
Clams, hard, public			563,288	$24,644				
Oysters:								
Market, public, spring							677,655	$44,581
Market, public, fall							783,975	57,663
Market, private, spring							38,700	3,776
Market, private, fall							10,012	805
Scallops, bay					3,478	$166		
Total	67,546	7,225	563,288	24,644	3,478	166	1,510,342	106,825

Species	Rakes		Forks		Coquina scoops	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:						
Coquina					5,740	$48
Hard, public	4,320	$756	223,848	$10,067		
Total	4,320	756	223,848	10,067	5,740	48

Species	Hooks, sponge		Diving outfits		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Frogs					52,168	$6,260
Clams, hard, public					2,864	318
Conchs	3,500	$280				
Oysters:						
Market, public, spring					6,240	412
Market, public, fall					16,000	1,036
Market, private, spring					107,560	5,080
Market, private, fall					108,634	8,701
Scallops, bay					10,048	758
Sponges:						
Grass	112,282	24,238	6,298	$1,889		
Sheepswool	123,262	204,528	188,698	496,640		
Velvet	190	99				
Wire	124	30	12,390	4,956		
Yellow	42,412	12,860	75,765	35,800		
Total	281,770	242,035	283,151	539,285	303,514	22,565

Fisheries of Florida, 1931—Continued

OPERATING UNITS: By counties

Item	Bay	Brevard	Broward	Charlotte	Citrus	Clay	Collier	Dade
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	156	5						20
On boats and shore:								
Regular	197	151		183	172	36	160	445
Casual	25	47	70	43	25		25	119
Total	378	203	70	226	197	36	185	584
Vessels:								
Motor	17	1						3
Net tonnage	437	19						39
Boats:								
Motor	51	76	33	93	63	10	66	287
Other	62	115	8	171	185	26	147	90
Accessory boats								2
Apparatus:								
Purse seines:								
Menhaden	1							
Length, yards	280							
Other								1
Length, yards								300
Haul seines:								
Common	15			6		10		
Length, yards	6,000			2,700		8,000		
Gill nets:								
Runaround	19	114		104	123		129	110
Square yards	13,060	99,600		99,134	72,364		141,210	256,630
Trammel nets	2			5			9	
Square yards	1,100			4,100			15,860	
Lines:								
Hand	173	36	30	60	33		71	150
Hooks	340	36	30	60	33		71	150
Troll		20	50	32	2		8	304
Hooks		20	70	32	2		8	424
Trot with hooks		2				22		
Hooks		630				8,600		
Stop nets				8				
Square yards				12,500				
Dip nets, drop								40
Cast nets			4					
Otter trawls		16						2
Yards at mouth		320						40
Pots:								
Crab		28						100
Sea crawfish			1,000					1,000
Spears	6							
Dredges, clam							1	
Tongs	60			5	40			
Forks							18	

Item	Duval	Escambia	Franklin	Glades	Gulf	Hernando	Hillsborough	Indian River
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5	333	24		56		22	
On boats and shore:								
Regular	170	164	475	113	28	6	75	79
Casual	40	18	10		5		12	50
Total	215	515	509	113	89	6	109	129
Vessels:								
Motor	2	36	5		2		4	
Net tonnage	18	1,897	29		96		47	
Sail		4						
Net tonnage		249						
Total vessels	2	40	5		2		4	
Total net tonnage	18	2,146	29		96		47	
Boats:								
Motor	71	49	187	36	6	1	33	32
Other	87	30	92	91	5	6	59	30
Apparatus:								
Purse seines:								
Menhaden					2			
Length, yards					560			

Fisheries of Florida, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Duval	Escambia	Franklin	Glades	Gulf	Hernando	Hillsborough	Indian River
Apparatus—Continued								
Haul seines:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Common		6	7		3			
Length, yards		2,120	2,600		1,200			
Long				21				
Length, yards				21,600				
Gill nets:								
Drift	70		2					
Square yards	100,000		950					
Runaround	4	10	28		2	6	59	76
Square yards	5,330	61,400	18,580		4,200	3,740	43,360	69,000
Trammel nets		22						
Square yards		11,684						
Lines:								
Hand	38	397	44		5		50	18
Hooks	76	1,104	88		5		88	36
Troll								34
Hooks								34
Trot with baits or snoods	4							
Baits or snoods	600							
Trot with hooks	48		13					
Hooks	14,400		970					
Dip nets: Drop		8						
Cast nets							6	
Otter trawls	21	4	62					
Yards at mouth	420	48	733					
Pots: Fish			240	3,500				
Spears			7					
Dredges:								
Scallop			2					
Yards at mouth			2					
Tongs		29	220		4			

Item	Jefferson	Lee	Levy	Manatee	Martin	Monroe	Nassau	Okaloosa
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							91	
On boats and shore:								
Regular	10	235	155	96	60	449	218	122
Casual	8	35	35	6	20	19	20	
Total	18	270	190	102	80	468	329	122
Vessels:								
Motor							14	
Net tonnage							266	
Boats:								
Motor	3	127	70	44	30	105	83	29
Other	18	238	164	87	10	300	39	30
Apparatus:								
Purse seines:								
Menhaden							2	
Length, yards							1,600	
Haul seines:								
Common				8				14
Length, yards				2,000				5,600
Long					2			
Length, yards					2,000			
Gill nets:								
Anchor						12		
Square yards						9,600		
Drift							11	
Square yards							2,300	
Runaround	10	216	100	86	50	46	3	2
Square yards	5,850	155,200	52,280	81,570	60,000	124,720	2,700	712
Stake							3	
Square yards							1,500	
Trammel nets		5	46	6				34
Square yards		5,650	22,777	5,160				17,994

Note.—Fish pots were formerly shown as wire baskets in Franklin County and fyke nets in Lake Okeechobee.

Fisheries of Florida, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Jefferson	Lee	Levy	Manatee	Martin	Monroe	Nassau	Okaloosa
Apparatus—Continued								
Lines:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Hand	18	61	47	20		51	40	61
Hooks	18	61	47	20		51	80	122
Troll		26	54	6	40	94		
Hooks		26	54	6	80	94		
Trot with hooks			4					
Hooks			400					
Pound nets			5					
Dip nets, common						64		
Otter trawls							75	
Yards at mouth							1,500	
Pots:								
Crab						165		
Sea crawfish						73		
Spears								2
Tongs			33					2
Forks				2				
Hooks, sponge						236		

Item	Okeechobee	Palm Beach	Pasco	Pinellas	Putnam	St. Johns	St. Lucie
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				51		39	13
On boats and shore:							4
Regular	29	308	26	775	180	283	233
Casual	30	120		117		25	6
Total	59	428	26	943	180	347	252
Vessels:							
Motor				7		15	5
Net tonnage				144		180	68
Boats:							
Motor	4	133	13	161	68	100	102
Other	20	54	26	269	116	24	55
Apparatus:							
Haul seines:							
Common				11			
Length, yards				4,050			
Long	4				43		
Length, yards	4,000				33,600		
Gill nets:							
Drift				14	18		
Square yards				8,400	56,000		
Runaround		274	26	209	20	6	203
Square yards		246,600	16,350	292,955	58,000	3,000	322,287
Trammel nets				7			
Square yards				4,200			
Lines:							
Hand		12		158		35	
Hooks		12		241		35	
Troll		212		35			240
Hooks		424		51			240
Trot with hooks	28				40		
Hooks	8,400				29,600		
Pound nets					20		
Fyke nets					50		
Cast nets		8					
Otter trawls						105	40
Yards at mouth						2,100	800
Pots:							
Crab				1,150			
Eel					45		
Fish	500						
Spears	15						
Tongs							12
Rakes						8	
Forks				15			
Hooks, sponge				36			
Diving outfits				55			

Fisheries of Florida, 1931—Continued

OPERATING UNITS: By counties—Continued

Item	Santa Rosa	Sarasota	Semi-nole	Taylor	Volusia	Wakulla	Walton
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					11		
On boats and shore:							
Regular	13	188	108	70	178	175	10
Casual	7	17		37	25	140	
Total	20	205	108	107	214	315	10
Vessels:							
Motor					4		
Net tonnage					32		
Boats:							
Motor	5	80	15	5	77	50	3
Other	6	203	50	80	56	241	5
Apparatus:							
Haul seines:							
Common		8	30		1	4	
Length, yards		2,640	5,400		150	1,200	
Long					3		
Length, yards					2,200		
Gill nets:							
Runaround		211		40	25	226	
Square yards		324,640		18,660	19,250	116,620	
Trammel nets	5	5				36	5
Square yards	2,200	13,050				12,600	1,500
Lines:							
Hand		26		53	15		
Hooks		26		53	30		
Troll		84					
Hooks		84					
Trot with baits or snoods					1		
Baits or snoods					240		
Trot with hooks			108	1			
Hooks			54,000	100			
Otter trawls					58		
Yards at mouth					1,160		
Spears	10						
Tongs	11				20	13	
Forks					12		
Coquina scoops					2		
Hooks, sponge				30			

CATCH: By counties

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	244,145	$3,549	25,650	$1,086	1,500	$150	36,716	$1,335
Blue runner or hardtail	19,800	192	1,500	75			7,304	92
Bonito							550	8
Cabio or crab eater							2,100	42
Catfish and bullheads			20,000	800				
Cigarfish	20,500	512						
Crevalle			1,500	30	500	25	4,871	61
Croaker							8,360	105
Drum:								
Black			2,650	53			330	6
Red or redfish	6,160	126	32,888	1,045			107,992	1,366
Flounders	4,180	152					17,492	504
Groupers	489,382	9,786	750	15	12,000	360	5,950	119
Grunts							3,000	60
Jewfish	600	12					850	17
Kingfish or "king mackerel"	22,044	802			170,000	10,200	28,229	1,121
King whiting or "kingfish"			2,500	50			6,969	90
Menhaden	912,800	3,788						
Mojarro							13,706	186
Mullet	573,599	11,472	1,347,553	20,588	2,000	100	1,445,394	21,679
Muttonfish					5,000	500	6,050	121
Permit							4,290	56
Pigfish			3,000	60			3,700	53
Pinfish or sailors choice			28,000	560				
Pompano	10,200	1,300	25,703	3,355			59,635	10,843
Porgies	12,900	258						
Sheepshead	3,300	75	40,000	1,200			82,826	1,074

Fisheries of Florida, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Snapper:								
Mangrove			750	$15			12,537	$150
Red	820,504	$49,224	1,500	30				
Snook or sergeantfish			3,000	90			53,366	677
Spanish mackerel	360,101	9,821	15,750	630	1,000	$70	156,071	5,246
Spot	2,200	40	42,000	840			3,740	49
Squeteagues or "sea trout":								
Gray			2,250	135			1,797	48
Spotted	98,298	3,727	229,689	11,384			239,216	12,111
Tenpounder	58,200	1,434						
Tripletail							800	16
Yellowtail							4,994	100
Crabs, hard			7,800	273				
Sea crawfish or spiny lobster					90,000	9,000		
Shrimp			539,700	21,588				
Oysters:								
Market, public, spring	65,348	5,766					14,130	1,178
Market, public, fall	92,956	8,152					9,180	459
Total	3,817,217	110,188	2,374,133	63,902	282,000	20,405	2,342,145	58,972

Species	Citrus		Clay		Collier		Dade	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack							4,000	$150
Barracuda							18,720	749
Black bass			9,000	$900				
Bluefish	8,635	$314			17,224	$626	25,000	2,900
Blue runner or hardtail					15,479	141	10,000	400
Catfish and bullheads			178,000	7,120				
Crappie			2,450	113				
Crevalle					2,915	27	3,000	90
Drum:								
Black					550	5		
Red or redfish	43,164	888			159,201	2,169		
Flounders	594	22			649	22		
Groupers	1,200	24			6,300	126	95,000	5,290
Grunts					3,450	69	4,000	120
Jewfish							2,250	90
Kingfish or "king mackerel"	1,684	61			15,015	410	1,830,039	91,502
Mullet	1,813,380	36,268			1,654,537	24,816	1,012,000	21,685
Muttonfish					314	6		
Pigfish	440	12			335	5		
Pompano	253	34			80,628	14,659	10,000	2,000
Porgies							1,000	30
Sea bass							1,000	50
Sheepshead	21,267	423			200,529	2,725	1,000	30
Snapper:								
Mangrove	22,341	459					9,000	900
Red							80,000	7,000
Snook or sergeantfish					36,178	493	1,000	50
Spanish mackerel	2,696	123			101,260	2,193	1,238,000	62,310
Squeteagues or "sea trout," spotted	119,816	7,182			238,056	12,990	6,000	520
Sunfish			4,000	120				
Tenpounder	15,164	176						
Tripletail					758	13		
Yellowtail					10,800	216	58,000	5,800
Crabs, stone							22,657	2,266
Sea crawfish or spiny lobster							213,800	21,882
Shrimp							20,000	800
Clams, hard, public					783,128	34,262		
Oysters:								
Market, public, spring	32,895	1,633						
Market, public, fall	49,080	2,510						
Total	2,132,609	50,129	193,450	8,253	3,327,356	95,973	4,665,466	226,614

Fisheries of Florida, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Duval		Escambia		Franklin		Glades	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass							291, 529	$26, 238
Bluefish	1, 116	$56	27, 268	$744	23, 008	$442		
Blue runner or hardtail			13, 281	121	1, 320	12		
Cabio or crab eater	400	24	212	6				
Catfish and bullheads	50, 300	2, 515			246, 890	8, 978	602, 488	29, 124
Crappie							214, 624	6, 438
Croaker			880	16				
Drum:								
Black			4, 961	90	220	8		
Red or redfish	2, 214	111	2, 530	46	8, 855	242		
Eels	2, 200	110			168	3		
Flounders			1, 221	67	7, 684	308		
Groupers	412	12	1, 136, 786	33, 937	306, 036	6, 121		
Jewfish			1, 420	43	670	13		
Kingfish or "king mackerel"	1, 982	99	2, 206	60				
King whiting or "kingfish"	19, 552	586	374	7	1, 430	22		
Menhaden					3, 000	90		
Mullet	254, 092	7, 622	264, 583	6, 715	773, 602	15, 454		
Pigfish			250	5				
Pompano	1, 536	307	5, 733	860	2, 122	276		
Porgies	48	2	15, 306	460	3, 400	68		
Sea bass	97, 692	4, 885			275	5		
Shad	151, 442	22, 383						
Sheepshead			1, 746	63	1, 100	31		
Snapper, red	13, 608	952	2, 448, 333	171, 657	287, 778	17, 269		
Spadefish			92	2	55	1		
Spanish mackerel			158, 462	4, 322	38, 230	1, 252		
Spot	2, 440	67			203	4		
Squeteagues or "sea trout":								
Gray	200	10	385	7				
Spotted	40, 622	4, 062	9, 250	328	55, 324	2, 493		
Sturgeon					5, 854	410		
Sunfish							329, 392	9, 782
Tenpounder					11, 902	357		
Crabs, hard	32, 265	1, 613	3, 570	92				
Shrimp	767, 850	30, 714	72, 525	4, 352	1, 730, 377	50, 270		
Oysters:								
Market, public, spring			50, 932	4, 494	468, 354	27, 847		
Market, public, fall			88, 604	7, 818	443, 638	30, 485		
Scallops, bay					3, 478	166		
Total	1, 439, 971	76, 130	4, 310, 910	236, 312	4, 424, 973	162, 627	1, 438, 033	71, 582

Species	Gulf		Hernando		Hillsborough		Indian River	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	45, 452	$1, 564	1, 320	$48	1, 526	$85	10, 000	$760
Cabio or crab eater					13	1		
Crevalle					547	10	5, 200	144
Croaker							1, 700	36
Drum:								
Black	110	2					1, 800	36
Red or redfish	1, 650	45	10, 230	279	27, 610	517	13, 450	526
Flounders	550	25			557	19		
Groupers					161, 883	3, 236	8, 000	480
Grunts					304	6		
Kingfish or "king mackerel"							4, 000	200
King whiting or "kingfish"	110	2					16, 000	380
Menhaden	3, 517, 580	7, 994						
Mullet	290, 499	5, 810	90, 450	1, 809	456, 252	12, 518	170, 000	3, 750
Muttonfish							9, 000	270
Pigfish							1, 900	57
Pinfish or sailors choice							6, 100	122
Pompano	9, 020	1, 151			2, 189	398	48, 500	8, 200
Porgies					1, 200	24		
Sheepshead	220	6	1, 045	28	9, 460	176	4, 000	120
Snapper:								
Mangrove			4, 730	129	1, 946	38	7, 000	280
Red					230, 805	13, 849	6, 500	552
Snook or sergeantfish					5, 610	102	20, 000	880
Spanish mackerel	119, 284	3, 253			515	24	11, 090	1, 109
Spot					1, 063	20	21, 000	420
Squeteagues or "sea trout":								
Gray					2, 640	48		
Spotted	16, 313	906	9, 526	520	128, 535	8, 582	66, 160	6, 126
Tenpounder	10, 000	200			187	3		
Oysters, market, public, fall	7, 800	510						
Total	4, 018, 588	21, 468	117, 301	2, 813	1, 032, 842	39, 656	431, 400	24, 448

Fisheries of Florida, 1931—Continued

CATCH: By COUNTIES—Continued

Species	Jefferson		Lee		Levy		Manatee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			19,663	$715	49,134	$2,242	11,316	$405
Blue runner or hardtail			14,410	131	47,368	4,670	1,650	15
Cabio or crab eater			4,500	90	1,784	53	400	8
Catfish and bullheads					12,853	467		
Crevalle							880	8
Croaker							550	10
Drum:								
Black			1,320	18	473	17	660	6
Red or redfish	6,655	$182	247,160	3,503	47,765	1,302	50,891	819
Flounders			5,500	81	7,260	262	935	25
Groupers			12,600	252	4,748	95	800	16
Grunts			8,300	166	120	2		
Jewfish					844	17		
Kingfish or "king mackerel"			37,859	1,376	96,206	3,498	3,597	164
Mojarro							12,600	214
Mullet	138,225	2,764	2,565,795	38,485	1,236,819	24,737	971,508	17,226
Permit							440	4
Pigfish			6,580	98			1,320	12
Pompano			79,047	14,372	29,111	4,764	14,181	2,579
Porgies					1,496	28	300	6
Sea bass					4,250	85		
Sheepshead	2,640	72	220,859	3,179	27,817	758	45,980	836
Snapper:								
Mangrove			21,175	302	5,804	162	3,300	60
Red					1,260	88		
Snook or sergeantfish			37,697	533			37,620	684
Spanish mackerel			219,209	5,978	39,812	1,756	36,998	1,333
Spot					440	8		
Squeteagues or "sea trout":								
Gray							6,382	116
Spotted	28,413	1,291	380,088	20,732	271,290	13,404	132,973	6,681
Sturgeon					8,793	639		
Yellowtail			13,600	272				
Clams, hard, public							480	48
Oysters:								
Market, public, spring			1,615	119	12,181	796		
Market, public, fall			2,125	156	22,503	1,347		
Turtles, green					14,586	729		
Total	175,933	4,309	3,899,102	90,558	1,944,717	61,926	1,335,761	31,275

Species	Martin		Monroe		Nassau		Okaloosa	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	63,000	$5,670	3,307	$120	700	$70	16,154	$294
Blue runner or hardtail	800	24	5,830	106			19,250	175
Cero			2,310	84				
Cigarfish							15,340	307
Crevalle	15,000	450						
Croaker	1,800	36			75	3		
Drum:								
Black	900	18	165	3			1,540	28
Red or redfish	2,500	75	10,065	149	200	6	7,150	130
Flounders					6,000	180	4,675	295
Groupers			6,750	135			74,083	2,222
Grunts			1,200	24				
Jewfish			1,200	24			350	10
Kingfish or "king mackerel"	60,000	2,400	425,267	19,260			1,320	36
King whiting or "kingfish"	1,800	54			90,500	2,715	440	8
Menhaden					3,710,000	8,984	12,660	283
Mojarro	27,000	810						
Mullet	250,000	3,750	105,450	1,942			209,677	5,241
Muttonfish			5,300	106				
Pigfish	2,000	60						
Pinfish or sailors choice	3,000	90						
Pompano	24,000	6,120	3,723	677			9,606	1,441
Porgies			500	10			4,200	126
Shad					10,500	1,575		
Sharks			925,000	2,960				
Sheepshead	4,400	176	9,273	146			4,730	172
Snapper:								
Mangrove	4,000	160	3,850	105				
Red			4,100	123	10,000	700	101,145	7,080
Snook or sergeantfish	23,000	920	330	4				
Spadefish							330	6
Spanish mackerel	180,000	12,600	505,979	13,799			70,629	1,926
Spot	16,000	480	330	6	300	12	550	10

Fisheries of Florida, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Martin		Monroe		Nassau		Okaloosa	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Squeteagues or "sea trout":								
Gray					3,000	$300	220	$4
Spotted	25,000	$2,000	10,037	$548	12,250	1,225	25,802	1,409
Sturgeon					87	37		
Tenpounder							16,412	328
Tripletail			150	3				
Turbot			340	3				
Yellowtail			16,400	328				
Crabs, stone			13,500	945				
Sea crawfish or spiny lobster			152,107	10,648				
Shrimp					6,578,320	209,171		
Conchs			3,500	280				
Oysters:								
Market, public, spring					2,625	233		
Market, public, fall					7,875	700	4,080	360
Market, private, spring					107,560	5,080		
Market, private, fall					108,634	8,701		
Turtles, green			16,500	1,167				
Sponges:								
Grass			55,272	7,167				
Sheepswool			67,994	78,691				
Velvet			190	99				
Wire			124	30				
Yellow			28,854	6,390				
Total	704,200	35,893	2,384,897	146,082	10,648,626	239,692	600,343	21,891

Species	Okeechobee		Palm Beach		Pasco		Pinellas	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Amberjack							2,420	$44
Black bass	49,681	$4,200						
Bluefish			367,204	$29,376	3,520	$128	103,909	5,147
Blue runner or hardtail			20,000	400			2,855	142
Cabio or crab eater							104	2
Catfish and bullheads	204,315	10,636						
Crappie	82,257	2,468						
Crevalle			5,000	150			220	2
Croaker			4,000	120				
Drum:								
Black							1,661	30
Red or redfish			6,000	240	13,750	375	65,607	1,536
Flounders							14,098	398
Groupers			7,000	170			275,282	5,503
Jewfish							1,380	28
Kingfish or "king mackerel"			377,100	17,119			39,310	1,575
King whiting or "kingfish"			5,000	150				
Ladyfish							2,878	57
Mojarro			1,000	50				
Mullet			2,000	100	488,912	9,778	2,307,305	55,514
Muttonfish			10,000	300				
Pigfish							2,306	42
Pompano			50,000	10,000	110	18	22,630	4,088
Porgies							5,220	105
Sheepshead			3,000	90	1,320	36	28,625	770
Snapper:								
Mangrove					6,820	186	5,557	144
Red							499,067	29,943
Snook or sergeantfish			3,000	90			7,506	136
Spadefish							56	1
Spanish mackerel			709,205	35,480	275	8	395,816	16,575
Spot							588	11
Squeteagues or "sea trout":								
Gray							2,117	38
Spotted			8,000	800	11,978	653	273,947	14,942
Sunfish	92,665	2,780						
Tenpounder							4,356	87
Crabs, stone							106,680	6,378
Frogs	104,336	12,520						
Clams, hard, public							4,792	479
Scallops, bay							10,048	758
Turtles, soft-shell	8,024	160						
Sponges:								
Grass							62,983	18,895
Sheepswool							221,808	583,827
Wire							12,390	4,956
Yellow							89,079	42,097
Total	541,278	32,764	1,577,509	94,635	526,685	11,182	4,572,600	794,250

Fisheries of Florida, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Putnam		St. Johns		St. Lucie		Santa Rosa	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	320,586	$1,606						
Black bass	69,749	7,233						
Bluefish			100	$10	70,000	$4,890		
Blue runner or hardtail					21,500	430		
Catfish and bullheads	1,841,598	72,659						
Crappie	167,390	7,497						
Crevalle					26,500	530		
Croaker					26,000	520		
Drum:								
Black			384	8	7,700	154		
Red or redfish	2,588	58	15,680	1,098	27,888	1,116	3,800	$105
Eels	976	29						
Flounders			1,950	58			8,393	606
Groupers					5,000	100		
Hickory shad	25,248	758						
Kingfish or "king mackerel"					227,555	11,102		
King whiting or "kingfish"			1,650	50	36,500	730		
Mojarro					17,500	350		
Mullet	10,133	379			539,000	8,085	138,980	3,474
Pigfish					2,500	50		
Pinfish or sailors choice			4,458	175	2,500	50		
Pompano			50	10	22,400	5,600		
Shad	262,268	32,184						
Sheepshead					27,000	810	550	20
Snapper, red			250	7				
Snook or sergeantfish					27,888	1,116		
Spanish mackerel					378,233	15,129		
Spot	5,408	162			30,750	615		
Squeteagues or "sea trout":								
Gray					4,083	367	660	12
Spotted			17,000	1,530	63,000	5,670	3,960	216
Sunfish	135,768	4,072						
Shrimp			5,319,450	212,779	2,110,000	84,400		
Clams, hard, public			4,320	756				
Oysters:								
Market, public, spring			2,000	60	13,500	1,400	8,840	780
Market, public, fall			6,000	180	25,988	2,695	13,838	1,221
Market, private, fall					1,012	105		
Turtles, soft-shell	6,666	73						
Total	2,848,378	126,710	5,373,292	216,721	3,713,997	146,014	179,021	6,434

Species	Sarasota		Seminole		Taylor	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	10,005	$364			3,113	$85
Blue runner or hardtail	10,560	96				
Catfish and bullheads			200,000	$10,000	983	38
Crappie			15,000	600		
Crevalle	440	4				
Croaker	2,640	24				
Drum:						
Black	275	3				
Red or redfish	35,797	406			37,050	1,065
Flounders	2,210	62			2,640	96
Groupers	2,553	51				
Grunts	200	4				
Kingfish or "king mackerel"	71,491	3,249				
Mullet	1,045,543	15,683			375,653	7,513
Pigfish	5,915	70				
Pompano	40,467	7,358			2,585	352
Porgies	440	8				
Shad			196,665	27,533		
Sheepshead	68,312	784			14,355	392
Snapper, mangrove	2,060	24			2,090	57
Snook or sergeantfish	7,563	85				
Spanish mackerel	94,654	3,197			2,145	58
Spot	275	2			440	12
Squeteagues or "sea trout," spotted	96,557	4,389			106,723	5,757
Sunfish			7,500	300		
Clams, hard, public	1,280	160				
Sponges:						
Grass					325	65
Sheepswool					22,158	38,650
Yellow					244	173
Total	1,499,237	36,023	419,165	38,433	570,504	54,313

Fisheries of Florida, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Volusia		Wakulla		Walton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass	3,600	$396				
Bluefish	2,300	230	16,270	$274		
Blue runner or hardtail			7,150	65		
Catfish and bullheads	92,000	3,680				
Crappie	8,000	400				
Crevalle	3,000	60				
Croaker			660	12		
Drum:						
Black	2,000	40			220	$6
Red or redfish	12,000	640	38,813	1,059	2,090	96
Flounders			440	16	110	4
King whiting or "kingfish"	23,000	690			550	15
Mullet	263,000	3,995	1,452,997	29,062	100,850	2,017
Pigfish	30,000	600				
Pinfish or sailors choice	2,000	200				
Pompano	4,000	1,000			110	22
Sheepshead	1,500	30	12,650	345	1,265	34
Snapper, mangrove	1,500	30				
Spot	4,000	80				
Squeteagues or "sea trout", spotted	115,000	5,750	133,804	6,083	10,285	468
Sunfish	22,000	660				
Crabs, hard	16,900	845				
Shrimp	1,714,600	68,584				
Clams:						
Coquina	5,740	48				
Hard, public	320	80				
Oysters:						
Market, public, spring	3,672	228	7,803	459		
Market, public, fall	16,057	1,503	10,251	603		
Market, private, spring	38,700	3,776				
Market, private, fall	9,000	700				
Total	2,393,889	94,245	1,680,838	37,978	115,480	2,662

CATCH: BY DISTRICTS

Species	East coast		West coast		Lake Okeechobee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	320,586	$1,606				
Amberjack	4,000	150	2,420	$44		
Barracuda	18,720	749				
Black bass	82,349	8,529			341,210	$30,438
Bluefish	566,570	45,198	641,685	18,481		
Blue runner or hardtail	53,800	1,329	166,257	5,958		
Bonito			550	8		
Cabio or crab eater	400	24	9,113	202		
Catfish and bullheads	2,381,898	96,774	260,726	9,483	806,803	39,760
Cero			2,310	84		
Cigarfish			35,840	819		
Crappie	192,840	8,610			296,881	8,906
Crevalle	59,700	1,479	9,873	112		
Croaker	33,575	715	13,090	167		
Drum:						
Black	15,434	309	12,485	222		
Red or redfish	115,408	4,915	933,985	16,405		
Eels	3,176	139	168	3		
Flounders	7,950	238	79,188	2,964		
Groupers	128,162	6,427	2,484,353	61,623		
Grunts	4,000	120	16,574	331		
Hickory shad	25,248	758				
Jewfish	2,250	90	7,314	164		
Kingfish or "king mackerel"	2,670,676	132,622	744,228	31,612		
King whiting or "kingfish"	196,502	5,405	9,873	144		
Ladyfish			2,878	57		
Menhaden	3,710,000	8,984	4,446,040	12,155		
Mojarro	45,500	1,210	26,306	400		
Mullet	3,849,778	70,054	18,500,010	349,977		
Muttonfish	24,000	1,070	11,664	233		
Permit			4,730	60		
Pigfish	39,400	827	20,896	297		
Pinfish or sailors choice	46,058	1,197				
Pompano	186,189	36,592	371,350	65,192		
Porgies	1,048	32	44,962	1,093		
Sea bass	98,692	4,935	4,525	90		
Shad	620,875	83,675				

Fisheries of Florida, 1931—Continued

CATCH: BY DISTRICTS—Continued

Species	East coast		West coast		Lake Okeechobee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sharks			925,000	$2,960		
Sheepshead	80,900	$2,456	759,869	12,145		
Snapper:						
Mangrove	22,250	1,385	92,210	1,816		
Red	111,858	9,241	4,392,992	289,233		
Snook or sergeantfish	77,888	3,146	185,870	2,714		
Spadefish			533	10		
Spanish mackerel	2,533,278	127,328	2,302,136	70,864		
Spot	121,898	2,676	9,829	162		
Squeteagues or "sea trout":						
Gray	9,533	812	14,201	273		
Spotted	582,721	39,067	2,400,191	125,412		
Sturgeon	87	37	14,647	1,049		
Sunfish	169,268	5,152			422,057	$12,562
Tenpounder			116,221	2,585		
Tripletail			1,708	32		
Turbot			340	3		
Yellowtail	58,000	5,800	45,794	916		
Crabs:						
Hard	56,965	2,731	3,570	92		
Stone	22,657	2,266	120,180	7,323		
Sea crawfish or spiny lobster	303,800	30,882	152,107	10,648		
Shrimp	17,049,920	628,036	1,802,902	54,622		
Frogs					104,336	12,520
Clams:						
Coquina	5,740	48				
Hard, public	4,640	836	789,680	34,949		
Conchs			3,500	280		
Oysters:						
Market, public, spring	21,797	1,921	662,098	43,072		
Market, public, fall	55,920	5,078	744,055	53,621		
Market, private, spring	146,260	8,856				
Market, private, fall	118,646	9,506				
Scallops, bay			13,526	924		
Turtles:						
Green			31,086	1,896		
Soft-shell	6,666	73			8,024	160
Sponges:						
Grass			118,580	26,127		
Sheepswool			311,960	701,168		
Velvet			190	99		
Wire			12,514	4,986		
Yellow			118,177	48,660		
Total	37,065,476	1,412,095	45,009,059	2,077,021	1,979,311	104,346

Sponge fishery of Florida, 1931

OPERATING UNITS: BY GEAR

Item	Sponge hooks	Diving outfits	Total
	Number	*Number*	*Number*
Fishermen on boats and shore, regular	338	412	750
Boats:			
Motor		55	55
Other	287		287
Apparatus	302	55	

CATCH: BY GEAR

Sponges	Sponge hooks		Diving outfits		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Grass	112,282	$24,238	6,298	$1,889	118,580	$26,127
Sheepswool	123,262	204,528	188,698	496,640	311,960	701,168
Velvet	190	99			190	99
Wire	124	30	12,390	4,956	12,514	4,986
Yellow	42,412	12,860	75,765	35,800	118,177	48,660
Total	278,270	241,755	283,151	539,285	561,421	781,040

ALABAMA

Fisheries of Alabama, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, stake	Trammel nets	Lines			
				Hand	Troll	Trot with baits or snoods	Trot with hooks
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				98			
On boats and shore:							
Regular	36	4	72	15	2	6	38
Casual			5	28		12	
Total	36	4	77	141	2	18	38
Vessels:							
Motor				10			
Net tonnage				177			
Boats:							
Motor	7	1	28	6	1		4
Other	3	4	66	15		18	38
Apparatus:							
Number	6	22	65	141	2	18	182
Length, yards	3,900						
Square yards		3,500	21,063				
Hooks, baits, or snoods				249	2	3,025	18,550

Item	Fyke nets	Otter trawls	Spears	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		34		2		134
On boats and shore:						
Regular	30	240	5	126	12	450
Casual			22	3	26	71
Total	30	274	27	131	38	655
Vessels:						
Motor		17		1		28
Net tonnage		134		11		322
Boats:						
Motor	4	120		40		175
Other	30			47		188
Apparatus:						
Number	122	137	27	131		
Yards at mouth		1,778				

CATCH: BY GEAR

Species	Haul seines		Gill nets, stake		Trammel nets		Lines—Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	31,300	$1,380			3,575	$138		
Blue runner or hardtail	3,040	55						
Catfish and bullheads					4,015	182	2,354	$107
Crevalle	4,995	91						
Croaker	26,824	488			13,607	252	440	8
Drum:								
Black	605	11			1,720	38	121	2
Red or redfish	10,060	281			43,131	1,450	8,635	353
Flounders	167	9			8,664	566		
Groupers							107,876	3,039
Jewfish							118	4
King whiting or "kingfish"	8,289	219			2,200	56	330	6
Menhaden	3,548	71						
Mullet	457,188	13,716			859,086	23,808		
Pompano	418	57			4,763	651		
Sharks							20,000	75
Sheepshead	563	20			3,229	114	1,430	58
Snapper, red							863,201	60,430
Spanish mackerel	6,518	236			6,435	234		
Spot	508	14			275	6		
Squeteagues or "sea trout":								
Gray	1,183	32			4,730	164	1,815	60
Spotted	9,180	586			85,511	5,867	6,842	519
Sturgeon			15,134	$1,513				
Tenpounder	315	6						
Tripletail							71	3
Total	564,701	17,272	15,134	1,513	1,040,941	33,526	1,013,233	64,664

Fisheries of Alabama, 1931—Continued

CATCH: BY GEAR—Continued

Species	Lines—Continued						Fyke nets	
	Troll		Trot with baits or snoods		Trot with hooks			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pound*	*Value*
Buffalofish					23,474	$1,067	21,332	$970
Cabio or crab eater	550	$15						
Catfish and bullheads					87,528	3,979	48,876	2,221
Kingfish or "king mackerel"	1,320	60						
Paddlefish or spoonbill cat					2,403	109		
Crabs, hard			78,358	$1,062				
Total	1,870	75	78,358	1,062	113,405	5,155	70,208	3,191

Species	Otter trawls		Spears		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders			23,210	$1,630				
Crabs, soft							1,164	$254
Shrimp	2,475,200	$65,676						
Oysters:								
Market, public, spring					521,307	$18,236		
Market, public, fall					224,498	8,622		
Market, private, spring					3,536	260		
Market, private, fall					19,380	1,140		
Terrapin, diamond-back							1,655	496
Total	2,475,200	65,676	23,210	1,630	768,721	28,258	2,819	750

OPERATING UNITS: BY COUNTIES

Item	Baldwin	Mobile
Fishermen:	*Number*	*Number*
On vessels	4	130
On boats and shore:		
Regular	71	379
Casual	21	50
Total	96	559
Vessels:		
Motor	2	26
Net tonnage	17	305
Boats:		
Motor	27	148
Other	45	143
Apparatus:		
Haul seines	1	5
Length, yards	500	3,400
Gill nets, stake	22	
Square yards	3,500	
Trammel nets	30	35
Square yards	10,918	10,145
Lines:		
Hand	14	127
Hooks	14	235
Troll	2	
Hooks	2	
Trot with baits or snoods		18
Baits or snoods		3,025
Trot with hooks	4	178
Hooks	750	17,800
Fyke nets		122
Otter trawls	8	129
Yards at mouth	105	1,673
Spears	11	16
Tongs	21	110

Fisheries of Alabama, 1931—Continued

CATCH: BY COUNTIES

Species	Baldwin		Mobile	
	Pounds	*Value*	*Pounds*	*Value*
Bluefish	7,370	$268	27,505	$1,250
Blue runner or hardtail	924	17	2,116	38
Buffalofish			44,806	2,037
Cabio or crab eater	550	15		
Catfish and bullheads	13,035	592	129,738	5,897
Crevalle	220	4	4,775	87
Croaker	14,410	264	26,461	484
Drum:				
Black	693	13	1,753	38
Red or redfish	26,301	717	35,525	1,367
Flounders	4,510	270	27,531	1,935
Groupers			107,876	3,039
Jewfish			118	4
Kingfish or "king mackerel"	1,320	60		
King whiting or "kingfish"	660	12	10,159	269
Menhaden			3,548	71
Mullet	488,862	14,665	827,412	22,859
Paddlefish or spoonbill cat			2,403	109
Pompano	3,476	474	1,705	234
Sharks			20,000	75
Sheepshead	3,245	112	1,977	80
Snapper, red			863,201	60,430
Spanish mackerel	7,040	256	5,913	214
Spot	385	9	398	11
Squeteagues or "sea trout":				
Gray			7,728	256
Spotted	33,580	2,163	67,953	4,809
Sturgeon	15,134	1,513		
Tenpounder			315	6
Tripletail			71	3
Crabs:				
Hard			78,358	1,062
Soft			1,164	254
Shrimp	190,800	5,005	2,284,400	60,671
Oysters:				
Market, public, spring	3,825	169	517,482	18,067
Market, public, fall	11,135	491	213,363	8,131
Market, private, spring	3,536	260		
Market, private, fall	19,380	1,140		
Terrapin, diamond-back	978	293	677	203
Total	851,369	28,782	5,316,431	193,990

MISSISSIPPI

Fisheries of Mississippi, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Lines		Dip nets, drop	Cast nets
			Hand	Trot with baits or snoods		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels			16			
On boats and shore:						
Regular	108	80	20	36		
Casual		4	126	11	38	60
Total	108	84	162	47	38	60
Vessels:						
Motor			2			
Net tonnage			25			
Boats:						
Motor	18	29	11	6		
Other	8	45	120	41	18	
Apparatus:						
Number	18	46	162	47	138	60
Length, yards	4,045					
Square yards		15,353				
Hooks, baits, or snoods			188	11,996		

Fisheries of Mississippi, 1931—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Otter trawls	Spears	Dredges, oyster	Tongs	By hand	Total, exclusive of duplication
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:						
On vessels	176		409	4		485
On boats and shore:						
Regular	554	3	229	306		1,015
Casual		62			28	213
Total	730	65	638	310	28	1,713
Vessels:						
Motor	58		96	1		127
Net tonnage	608		1,375	6		1,683
Sail			5			5
Net tonnage			70			70
Total vessels	58		101	1		132
Total net tonnage	608		1,445	6		1,753
Boats:						
Motor	277		51	17		327
Other			5	285		499
Apparatus:						
Number	335	65	314	308		
Yards at mouth	4,226		315			

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Lines			
					Hand		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			18,358	$834				
Buffalofish					9,196	$502		
Cabio or crab eater					385	14		
Catfish and bullheads			25,644	932	26,818	1,076		
Crevalle			5,419	99	374	7		
Croaker			7,211	197	4,235	115		
Drum:								
Black			13,850	380	1,870	52		
Red or redfish			89,002	3,236	10,516	382		
Flounders			20,345	1,110				
Groupers					24,092	623		
Jewfish					690	17		
King whiting or "kingfish"			5,084	139				
Mullet			729,015	18,869				
Pompano			521	72				
Sheepshead			28,575	1,041	3,487	127		
Snapper, red					68,236	4,777		
Spanish mackerel			1,045	31	258	9		
Squeteagues or "sea trout":								
Gray			50,869	1,388	44,844	1,224		
Spotted			71,585	5,206	48,711	3,542		
Tenpounder			2,425	48				
Tripletail					484	22		
Crabs: Hard							382,197	$6,045
Shrimp	62,400	$1,560						
Total	62,400	1,560	1,068,948	33,582	244,196	12,489	382,197	6,045

Species	Dip nets, drop		Cast nets		Otter trawls		Spears	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croaker					495	$14		
Flounders					8,250	450	32,576	$2,369
King whiting or "kingfish"					1,320	36		
Mullet			17,080	$512				
Crabs: Hard	72,184	$1,031						
Shrimp			7,790	1,169	17,645,400	391,045		
Total	72,184	1,031	24,870	1,681	17,655,465	391,545	32,576	2,369

Fisheries of Mississippi, 1931—Continued

CATCH: BY GEAR—Continued

Species	Dredges, oyster		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs: Soft					4,592	$1,228
Oysters:						
Market, public, spring, Mississippi	1,301,871	$51,632	116,639	$6,640		
Market, public, fall, Mississippi	97,246	3,935	121,735	6,759		
Market, public, spring, Louisiana	1,204,848	49,477	56,403	3,049		
Market, public, fall, Louisiana	532,323	21,982	6,829	369		
Total	3,136,288	127,026	301,606	16,817	4,592	1,228

OPERATING UNITS: BY COUNTIES

Item	Hancock	Harrison	Jackson
	Number	*Number*	*Number*
Fisherman:			
On vessels		469	16
On boats and shore:			
Regular	30	818	167
Casual	46	116	51
Total	76	1,403	234
Vessels:			
Motor		125	2
Net tonnage		1,658	25
Sail		5	
Net tonnage		70	
Total vessels		130	2
Total net tonnage		1,728	25
Boats:			
Motor	12	261	54
Other	43	357	99
Apparatus:			
Haul seines		18	
Length, yards		4,045	
Trammel nets	8	18	20
Square yards	2,672	6,916	5,765
Lines:			
Hand	30	70	62
Hooks	30	70	88
Trot with baits or snoods		37	10
Baits or snoods		10,618	1,378
Dip nets, drop	138		
Cast nets		54	6
Otter trawls		294	41
Yards at mouth		3,732	494
Spears	9	39	17
Dredges, oyster		312	2
Yards at mouth		313	2
Tongs	13	242	53

CATCH: BY COUNTIES

Species	Hancock		Harrison		Jackson	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish					18,358	$834
Buffalofish					9,196	502
Cabio or crab eater			385	$14		
Catfish and bullheads	4,400	$160	33,473	1,216	14,589	632
Crevalle			539	10	5,254	96
Croaker	1,320	36	5,500	150	5,121	140
Drum:						
Black	5,500	150	4,851	135	5,369	147
Red or redfish	26,070	948	32,846	1,194	40,602	1,476
Flounders	14,190	864	34,116	2,259	12,865	806
Groupers					24,092	623
Jewfish					690	17
King whiting or "kingfish"	1,320	36	2,904	80	2,180	59
Mullet	63,850	1,916	90,946	2,727	591,299	14,738
Pompano			195	27	326	45
Sheepshead	6,270	228	5,412	199	20,380	741

Fisheries of Mississippi, 1931—Continued

CATCH: BY COUNTIES—Continued

Species	Hancock		Harrison		Jackson	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Snapper, red					68, 236	$4, 777
Spanish mackerel	440	$16	93	$3	770	21
Squeteagues or "sea trout":						
Gray	32, 901	897	31, 193	852	31, 619	863
Spotted	33, 781	2, 457	41, 330	3, 005	45, 185	3, 286
Tenpounder					2, 425	48
Tripletail	220	10	99	4	165	8
Crabs:						
Hard	72, 184	1, 031	326, 750	5, 384	55, 447	661
Soft	1, 400	350	3, 192	878		
Shrimp			15, 783, 450	345, 353	1, 932, 140	48, 421
Oysters:						
Market, public, spring, Mississippi	16, 058	868	1, 356, 313	54, 664	46, 139	2, 740
Market, public, fall, Mississippi	17, 868	966	170, 275	7, 889	30, 838	1, 839
Market, public, spring, Louisiana			1, 261, 251	52, 526		
Market, public, fall, Louisiana			539, 152	22, 351		
Total	297, 772	10, 933	19, 724, 265	500, 920	2, 963, 285	83, 520

LOUISIANA

Fisheries of Louisiana, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Lines			Dip nets, drop
			Hand	Trot with baits or snoods	Trot with hooks	
Fishermen:						
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	627	124	52	221	3	9
Casual	14		104	112		17
Total	641	124	156	333	3	26
Boats:						
Motor	139	56	22	28	3	11
Other	161	62	96	288		24
Apparatus:						
Number	143	61	156	333	3	1, 715
Length, yards	17, 995					
Square yards		16, 050				
Hooks, baits, or snoods			161	69, 060	300	

Item	Cast nets	Otter trawls	Dredges, oyster	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		150	68			214
On boats and shore:						
Regular	4	1, 528	14	501	121	2, 618
Casual	12			5	92	254
Total	16	1, 678	82	506	213	3, 086
Vessels:						
Motor		74	12			85
Net tonnage		487	140			620
Sail			4			4
Net tonnage			62			62
Total vessels		74	16			89
Total net tonnage		487	202			682
Boats:						
Motor		764	4	3		928
Other				503		1, 074
Apparatus:						
Number	16	838	36	506		
Yards at mouth		10, 720	36			

Fisheries of Louisiana, 1931—Continued

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Lines			
					Hand		Trot with baits or snoods	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	20,450	$558	33,780	$792	27,650	$773		
Crevalle			150	9				
Croaker	30,490	1,628	22,890	1,285	5,450	303		
Drum:								
Black	50,080	1,549	90,786	2,759	38,300	1,149		
Red or redfish	107,450	6,567	171,543	10,328	99,450	5,427		
Flounders	9,370	582	19,565	1,576				
Garfish			500	40				
Groupers					4,170	125		
Jewfish					7,050	212		
King whiting or "kingfish"	27,050	568	27,460	588	200	4		
Mullet	4,040	121	250	15				
Pompano	24	4	1,025	134				
Sharks					20,000	125		
Sheepshead	30,440	1,861	85,778	4,845	17,400	1,043		
Snapper, red					78,835	5,518		
Spanish mackerel					900	36		
Spot	5,860	173	4,615	136				
Squeteagues or "sea trout":								
Gray	80,470	1,642	138,835	2,808	88,250	1,765		
Spotted	135,672	13,593	211,553	20,402	112,390	10,852		
Tripletail			5,150	274	150	8		
Crabs, hard							4,853,730	$52,117
Shrimp	598,560	14,400						
Turtles, loggerhead	27,820	556						
Total	1,127,776	43,802	813,880	45,991	491,195	27,340	4,853,730	52,117

Species	Lines, trot with hooks		Dip nets, drop		Cast nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	1,750	$70						
Mullet					2,100	$63		
Crabs, hard			131,550	$742				
Shrimp					2,350	118	34,547,316	$829,543
Total	1,750	70	131,550	742	4,450	181	34,547,316	829,543

Species	Dredges, oyster		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, soft					120,784	$45,292
Oysters:						
Market, public, spring	259,848	$12,220	8,244	$643		
Market, public, fall	222,996	10,863				
Market, private, spring	19,420	1,832	1,672,917	137,048		
Market, private, fall	75,600	7,132	1,330,873	109,128		
Terrapin, diamond-back					21,312	6,390
Total	577,864	32,047	3,012,034	246,819	142,096	51,682

Fisheries of Louisiana, 1931—Continued

OPERATING UNITS: BY PARISHES

Item	Cameron	Iberia	Jefferson	La Fourche	Orleans	Plaquemines
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			18	52	26	46
On boats and shore:						
Regular	19	30	700	453	117	374
Casual		16	45	5	31	8
Total	19	46	763	510	174	428
Vessels:						
Motor			9	26	9	11
Net tonnage			60	167	70	88
Sail						4
Net tonnage						62
Total vessels			9	26	9	15
Total net tonnage			60	167	70	150
Boats:						
Motor	12	6	257	168	61	150
Other	8	28	180	170	52	103
Apparatus:						
Haul seines	6	6	38	18	10	14
Length, yards	405	690	4,920	1,890	1,230	2,010
Trammel nets	1	1	7	9	11	20
Square yards	130	235	1,945	2,645	1,785	6,035
Lines:						
Hand			18		18	
Hooks			18		23	
Trot with baits or snoods	3	8	51	5		9
Baits or snoods	340	845	10,180	1,350		1,450
Trot with hooks	3					
Hooks	300					
Dip nets, drop					1,265	
Cast nets	4				12	
Otter trawls	3	4	227	184	36	138
Yards at mouth	34	48	2,861	2,438	485	1,759
Dredges, oyster					8	12
Yards at mouth					8	12
Tongs	4	12	76	156		57

Item	St. Bernard	St. Charles	St. Mary	St. Tammany	Terrebonne	Vermilion
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	4		22	8	38	
On boats and shore:						
Regular	158	33	179	17	486	52
Casual	59	8	20	4	49	9
Total	221	41	221	29	573	61
Vessels, motor	2		7	2	19	
Net tonnage	17		77	22	119	
Boats:						
Motor	34	14	54	5	152	15
Other	147	18	105	10	236	17
Apparatus:						
Haul seines	16		3	3	20	9
Length, yards	2,345		390	325	2,415	1,375
Trammel nets	4		3	2	2	1
Square yards	1,385		755	540	460	135
Lines:						
Hand	52				68	
Hooks	52				68	
Trot with baits or snoods	135	18	96		3	5
Baits or snoods	29,965	3,240	21,050		340	300
Dip nets, drop				450		
Otter trawls	15	14	53		159	5
Yards at mouth	195	178	651		2,007	64
Dredges, oyster			8	4		4
Yards at mouth			8	4		4
Tongs			23	3	173	2

Fisheries of Louisiana, 1931—Continued

CATCH: BY PARISHES

Species	Cameron		Iberia		Jefferson		La Fourche	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	2,850	$114			1,050	$21		
Croaker	2,700	108	550	$16	2,220	99	1,000	$30
Drum:								
Black	250	9	800	24	16,970	510	16,350	500
Red or redfish	2,500	150	3,200	192	41,100	2,486	54,375	3,235
Flounders	4,200	168	50	4	2,695	216	9,800	784
King whiting or "kingfish"	850	26	600	18	19,400	388		
Mullet	2,100	63			2,300	70		
Sharks					2,000	125		
Sheepshead	2,550	153	800	48	12,450	766	37,360	1,867
Spanish mackerel					150	6		
Spot					850	23		
Squeteagues or "sea trout:"								
Gray	1,800	54	950	28	7,290	146	7,950	159
Spotted	9,800	980	3,750	375	76,195	7,233	46,175	3,694
Tripletail							3,150	157
Crabs:								
Hard	3,060	41	24,600	328	1,024,950	13,666	309,360	4,125
Soft					29,320	10,995		
Shrimp	127,000	2,944	178,700	4,364	9,659,642	231,824	7,592,068	182,215
Oysters:								
Market, private, spring	18,804	1,242	50,954	4,974	586,840	45,802	257,707	24,312
Market, private, fall	23,426	1,547	84,508	8,249	384,287	29,984	126,703	11,953
Terrapin, diamond-back					21,312	6,390		
Turtles, loggerhead					27,820	556		
Total	201,890	7,599	349,462	18,620	11,936,841	351,306	8,461,998	233,031

Species	Orleans		Plaquemines		St. Bernard		St. Charles	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	15,300	$306	15,730	$315	5,950	$119		
Croaker	11,900	714	11,490	690	16,530	992		
Drum:								
Black	12,200	367	47,336	1,420	50,010	1,501		
Red or redfish	30,760	1,845	52,508	3,151	34,860	2,091		
Flounders	850	68	4,420	354	1,720	138		
Groupers	4,170	125						
Jewfish	7,050	212						
King whiting or "kingfish"	2,100	42	11,710	234	8,200	164		
Mullet					1,590	47		
Pompano	750	90			199	30		
Sheepshead	13,250	795	27,698	1,662	17,310	1,038		
Snapper, red	78,835	5,518						
Spanish mackerel					750	30		
Spot	800	24	4,475	133	3,250	96		
Squeteagues or "sea trout:"								
Gray	6,550	131	83,025	1,660	169,590	3,391		
Spotted	9,350	935	88,365	8,837	123,880	12,388		
Tripletail			1,500	74	300	16		
Crabs:								
Hard	44,850	598	145,500	1,940	860,760	11,477	258,000	$3,440
Soft	7,580	2,841	4,760	1,785	74,172	27,814		
Shrimp	1,445,522	34,750	5,796,106	139,105	613,224	14,718	598,000	14,352
Oysters:								
Market, public, spring	68,648	3,232	83,895	3,948				
Market, public, fall	117,744	5,540	24,429	1,149				
Market, private, spring	19,420	1,832	115,841	9,047				
Market, private, fall	75,600	7,132	143,630	11,178				
Total	1,973,229	67,097	6,662,418	186,682	1,982,295	76,050	856,000	17,792

Species	St. Mary		St. Tammany		Terrebonne		Vermilion	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads			1,550	$31	39,500	$1,185	1,700	$102
Crevalle							150	9
Croaker	2,540	$76	3,500	210	4,600	137	1,800	144
Drum:								
Black	3,150	94	8,500	255	22,150	665	1,450	112
Red or redfish	9,200	552	6,040	302	129,300	7,758	5,600	560
Flounders	250	20	650	52	4,150	332	150	22
Garfish							500	40
King whiting or "kingfish"	1,800	45	5,300	106	3,700	74	1,050	63
Mullet			150	4			250	15
Pompano					100	18		

Fisheries of Louisiana, 1931—Continued

CATCH: BY PARISHES—Continued

Species	St. Mary		St. Tammany		Terrebonne		Vermilion	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sheepshead	2,600	$156	4,350	$261	13,050	$783	2,200	$220
Spot			1,100	33				
Squeteagues or "sea trout":								
Gray	2,700	66	18,100	362	8,950	179	650	39
Spotted	9,800	980	15,000	1,500	73,400	7,340	3,900	585
Tripletail							350	35
Crabs:								
Hard	2,160,000	16,200	86,700	144	6,300	84	61,200	816
Soft			4,952	1,857				
Shrimp	2,207,256	53,425			6,698,128	160,767	232,580	5,597
Oysters:								
Market, public, spring	43,777	1,652	41,258	2,197			30,514	1,834
Market, public, fall			68,868	3,240			11,955	934
Market, private, spring	75,534	7,373			565,470	44,160	1,767	138
Market, private, fall	91,749	8,958	12,030	940	460,252	35,984	4,288	335
Total	4,610,356	89,597	278,048	11,494	8,029,050	259,466	362,054	11,600

TEXAS

Fisheries of Texas, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Tram-mel nets	Lines			
		Runa-round	Stake		Hand	Troll	Trot with baits or snoods	Trot with hooks
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					95			
On boats and shore:								
Regular	100	102	286	138	173	3	10	22
Casual	74				193		7	
Total	174	102	286	138	461	3	17	22
Vessels:								
Motor					14			
Net tonnage					234			
Boats:								
Motor	2	29	45	57	68	3	2	4
Other	8	54	81	44	145		13	15
Apparatus:								
Number	59	102	391	81	461	6	29	34
Length, yards	10,000							
Square yards		23,279	97,172	27,003				
Hooks, baits, or snoods					667	6	3,670	4,970

Item	Otter trawls	Spears	Dredges, oyster	Tongs	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	80		18			155
On boats and shore:						
Regular	526	63	74	243	80	1,392
Casual		105		10	62	392
Total	606	168	92	253	142	1,939
Vessels:						
Motor	31		6			41
Net tonnage	261		54			454
Boats:						
Motor	262	3	24	43		444
Other				172	72	489
Apparatus:						
Number	294	168	30	253		
Yards at mouth	4,318		29			

Fisheries of Texas, 1931—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets				Trammel nets	
			Runaround		Stake			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish			2,640	$144				
Catfish and bullheads	25,080	$912	5,885	214	13,612	$495	11,770	$428
Crevalle			385	7				
Croaker	11,715	426	8,910	324			12,770	464
Drum:								
Black	46,475	1,690	160,944	4,649	837,346	22,971	68,970	2,078
Red or redfish	79,574	5,857	61,248	4,247	312,829	22,751	157,493	11,681
Flounders	8,525	787	2,530	230			1,925	159
King whiting or "kingfish"	7,920	288	4,290	156			2,585	94
Mullet	5,500	165	600	24				
Pompano	5,115	697	770	106			2,673	364
Sheepshead	7,590	414	3,685	201	8,690	369	8,415	429
Snook or sergeantfish	14,630	534	2,365	86	16,885	614	550	20
Spanish mackerel	2,750	100	7,755	282			2,320	99
Squeteagues or "sea trout", spotted	119,966	11,033	119,900	10,900	315,739	28,704	236,633	21,911
Total	334,840	22,903	381,907	21,570	1,505,101	75,904	506,104	37,727

Species	Lines							
	Hand		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	22,165	$810					16,170	$610
Croaker	880	32						
Drum:								
Black	21,725	750					660	24
Red or redfish	222,695	16,388					29,700	2,290
Groupers	45,831	1,367						
Jewfish	275	8						
Kingfish or "king mackerel"			3,740	$136				
Sheepshead	18,587	998						
Snapper, red	690,664	55,252						
Spanish mackerel	50,380	1,880						
Squeteagues or "sea trout", spotted	291,500	26,834						
Crabs, hard					49,455	$1,015		
Total	1,364,702	104,319	3,740	136	49,455	1,015	46,530	2,924

Species	Otter trawls		Spears		Dredges, oyster		Tongs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders			61,765	$5,819						
Shrimp	13,814,373	$458,152								
Oysters:										
Market, public, spring					176,921	$11,329	179,858	$12,299	48,848	$3,134
Market, public, fall					211,684	12,280	275,378	15,912	89,643	4,417
Total	13,814,373	458,152	61,765	5,819	388,605	23,609	455,236	28,211	138,491	7,551

Fisheries of Texas, 1931—Continued

OPERATING UNITS: By counties

Item	Aransas	Brazoria	Calhoun	Cameron	Galveston	Harris
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			20		99	
On boats and shore:						
Regular	123	6	199	210	271	5
Casual	23		68	19	114	
Total	146	6	287	229	484	5
Vessels:						
Motor			8		17	
Net tonnage			67		258	
Boats:						
Motor	35		76	30	129	2
Other	55	6	46	46	94	2
Apparatus:						
Haul seines			2		42	
Length, yards			150		8,350	
Gill nets:						
Runaround	13					
Square yards	2,210					
Stake	60		10	188		
Square yards	9,600		1,050	62,792		
Trammel nets	12		18	14	12	
Square yards	1,560		9,250	4,200	4,128	
Lines:						
Hand	30		68	23	172	
Hooks	30		68	35	360	
Trot with baits or snoods	8				16	
Baits or snoods	800				2,420	
Trot with hooks	20					
Hooks	3,750					
Otter trawls	16		58	10	104	
Yards at mouth	209		847	131	1,572	
Spears	20		35	10	28	
Dredges, oyster	2		14			
Yards at mouth	2		14			
Tongs	30	6	76		36	5

Item	Jefferson	Matagorda	Nueces	Refugio	San Patricio
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		10	16		10
On boats and shore:					
Regular		139	338	2	99
Casual	5	18	92	8	45
Total	5	167	446	10	154
Vessels:					
Motor		4	7		5
Net tonnage		41	51		37
Boats:					
Motor		46	80		46
Other	5	20	186	10	19
Apparatus:					
Haul seines			15		
Length, yards			1,500		
Gill nets:					
Runaround			51		38
Square yards			10,525		10,544
Stake			133		
Square yards			23,730		
Trammel nets		11	10		4
Square yards		4,665	2,000		1,200
Lines:					
Hand	5		118	8	37
Hooks	5		124	8	37
Troll					6
Hooks					6
Trot with baits or snoods	5				
Baits or snoods	450				
Trot with hooks			5	4	5
Hooks			450	240	530
Otter trawls		30	39		37
Yards at mouth		454	561		544
Spears		26	29		20
Dredges, oyster		14			
Yards at mouth		13			
Tongs		40	58	2	

Fisheries of Texas, 1931—Continued

CATCH: BY COUNTIES

Species	Aransas		Brazoria		Calhoun		Cameron	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	6,710	$244			9,790	$356	8,497	$309
Croaker	4,895	178			2,860	104	3,850	140
Drum:								
Black	31,130	1,132			13,090	476	584,223	15,933
Red or redfish	67,320	4,896			241,665	17,576	217,316	15,805
Flounders	4,400	400			8,580	780	935	85
King whiting or "kingfish"	1,980	72			1,980	72		
Pompano	385	52			165	22	715	98
Sheepshead	2,035	111			2,332	127	8,360	304
Snapper, red							24,487	1,959
Snook or sergeantfish	715	26			385	14	16,885	614
Spanish mackerel	1,155	42			1,320	48	550	20
Squeteagues or "sea trout", spotted	78,585	7,135			260,755	23,705	246,785	22,435
Crabs, hard	21,630	618						
Shrimp	891,184	30,300			1,378,330	48,240	357,915	10,737
Oysters:								
Market, public, spring	19,295	1,022	3,315	$244	101,749	6,061	1,920	225
Market, public, fall	36,482	1,824	3,570	262	95,198	6,683	2,688	315
Total	1,167,901	48,052	6,885	506	2,118,199	104,264	1,475,126	68,979

Species	Galveston		Harris		Jefferson		Matagorda	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads	12,540	$456					3,960	$144
Croaker	10,175	370					1,770	64
Drum:								
Black	7,040	256			220	$8	5,720	208
Red or redfish	63,074	4,777			1,320	120	12,463	1,133
Flounders	8,085	748					10,285	1,122
Groupers	44,511	1,331						
Jewfish	275	8						
King whiting or "kingfish"	5,005	182					1,540	56
Mullet	5,500	165						
Pompano	803	109					165	22
Sheepshead	8,195	447			55	3	1,870	102
Snapper, red	610,789	48,863						
Snook or sergeantfish	880	34						
Spanish mackerel	3,685	134					835	45
Squeteagues or "sea trout", spotted	128,557	11,986			1,760	192	22,462	2,450
Crabs, hard	22,575	322			5,250	75		
Shrimp	6,059,048	198,359					971,135	29,130
Oysters:								
Market, public, spring	14,637	1,256	3,145	$231			172,516	12,152
Market, public, fall	24,684	2,147	3,281	241			243,295	13,242
Total	7,030,058	271,950	6,426	472	8,605	398	1,448,016	59,870

Species	Nueces		Refugio		San Patricio	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	2,640	$144				
Catfish and bullheads	48,180	1,752	2,805	$128	2,200	$80
Crevalle	385	7				
Croaker	6,655	242			4,070	148
Drum:						
Black	472,587	13,345			22,110	804
Red or redfish	208,131	14,929	9,790	890	42,460	3,088
Flounders	34,320	3,120			8,140	740
Groupers	1,320	36				
Kingfish or "king mackerel"					3,740	136
King whiting or "kingfish"	1,980	72			2,310	84
Mullet					600	24
Pompano	5,500	751			825	113
Sheepshead	20,955	1,143	550	30	2,615	144
Snapper, red	55,388	4,430				
Snook or sergeantfish	13,750	500			1,815	66
Spanish mackerel	53,020	1,928			2,640	144
Squeteagues or "sea trout", spotted	222,734	20,249	7,150	780	114,950	10,450
Shrimp	2,049,016	69,721			2,107,745	71,665
Oysters:						
Market, public, spring	88,756	5,548	294	23		
Market, public, fall	167,110	7,864	397	31		
Total	3,452,427	145,781	20,986	1,882	2,316,220	87,686

FISHERIES OF THE PACIFIC COAST STATES[7]

The yield of fishery products in the Pacific Coast States (Washington, Oregon, and California) during 1931 amounted to 597,306,512 pounds, valued at $13,512,209. This is a decrease of 28 percent in the volume of the catch and 41 percent in the value of the catch as compared with the quantity and value for 1930. Of the total catch in 1931, 584,437,666 pounds, valued at $12,203,843, were fish and 12,868,846 pounds, valued at $1,308,366, were shellfish. These fisheries gave employment to 19,235 fishermen, or 2 percent less than in 1930. Of the total number of fishermen employed during 1931, 6,454 were employed on vessels and 12,781 in the boat and shore fisheries.

Fisheries of the Pacific Coast States, 1931

SUMMARY OF CATCH

Product	Washington		Oregon		California		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	136,690,063	$4,601,750	24,832,283	$1,216,821	422,915,320	$6,385,272	584,437,666	$12,203,843
Shellfish, etc	3,800,660	520,094	986,755	65,334	8,081,431	722,938	12,868,846	1,308,366
Total	140,490,723	5,121,844	25,819,038	1,282,155	430,996,751	7,108,210	597,306,512	13,512,209

OPERATING UNITS: BY STATES

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2,971	16	2	2,989	32	34	66
On boats and shore	1,653	3,152	1,478	6,283	2,209	1,212	3,421
Total	4,624	3,168	1,480	9,272	2,241	1,246	3,487
Vessels:							
Steam	3			3			
Net tonnage	71			71			
Motor	473	8	1	482	15	12	27
Net tonnage	9,705	66	20	9,791	163	102	265
Sail	2			2			
Net tonnage	804			804			
Total vessels	478	8	1	487	15	12	27
Total net tonnage	10,580	66	20	10,666	163	102	265
Boats:							
Motor	893	318	775	1,986	1,185	759	1,944
Other	483	174	148	805	76	116	192
Apparatus:							
Purse seines:							
Salmon	251			251			
Length, yards	155,118			155,118			
Haul seines	72		47	119	39	3	42
Length, yards	6,154		14,133	20,287	21,860	493	22,353
Gill nets:							
Drift:							
Salmon	296	86	506	888	886	424	1,310
Square yards	490,454	159,960	1,224,760	1,875,174	2,790,900	532,544	3,323,444
Set:							
Salmon	10	213	201	424	141	671	812
Square yards	3,480	70,290	48,441	122,211	35,955	107,360	143,315

[7] Data on the operating units and catch of the fisheries of the Pacific Coast States have been taken largely from statistics collected by the various State agencies. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections.

Fisheries of the Pacific Coast States, 1931—Continued

OPERATING UNITS: By States—Continued

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Apparatus—Continued							
Lines:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Trawl, set and hand	21,989	5	81	22,075	103	150	253
Hooks	460,727	500	8,100	469,327	11,550	18,750	30,300
Troll	2,167	184	286	2,637	860	513	1,373
Hooks	9,968	828	1,287	12,083	3,870	2,308	6,178
Pound nets	104	70	240	414	49		49
Brush weirs	7			7			
Fish wheels			32	32			
Dip nets	8	35	132	175	178		178
Drag bag nets	36	1		37			
Length, yards	3,078	60		3,138			
Reef nets	6			6			
Beam trawls	30			30			
Yards at mouth	204			204			
Traps:							
Crab	2,413	3,718		6,131		5,049	5,049
Crawfish					663		663
Tongs and rakes	212	128		340		2	2
Shovels	218	2,746		2,964		244	244
Spears		10		10			
Dredges, oyster		3		3			
Yards at mouth		5		5			

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	Southern district		Total	
				San Pedro division	San Diego division		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	16	265	519	1,795	804	3,399	6,454
On boats and shore	470	938	680	770	219	3,077	12,781
Total	486	1,203	1,199	2,565	1,023	6,476	19,235
Vessels:							
Steam		1				1	4
Net tonnage		32				32	103
Motor	6	30	50	233	104	423	932
Net tonnage	58	396	859	7,387	5,647	14,347	24,403
Sail		2				2	4
Net tonnage		824				824	1,628
Total vessels	6	33	50	233	104	426	940
Total net tonnage	58	1,252	859	7,387	5,647	15,203	26,134
Boats:							
Motor	154	557	227	401	114	1,453	5,383
Other	158	109	45	51	6	369	1,366
Apparatus:							
Purse seines:							
Barracuda				31		31	31
Length, yards				13,672		13,672	13,672
Salmon							251
Length, yards							155,118
Sardine			12	58		70	70
Length, yards			4,350	24,081		28,431	28,431
Tuna				71		71	71
Length, yards				40,500		40,500	40,500

Fisheries of the Pacific Coast States, 1931—Continued

OPERATING UNITS: BY STATES—Continued

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	Southern district		Total	
				San Pedro division	San Diego division		
Apparatus—Continued							
Lampara nets:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Mackerel				36		36	36
Length, yards				14,738		14,738	14,738
Sardine		13	54	35	18	120	120
Length, yards		2,210	17,350	15,400	4,070	39,030	39,030
Squid			38			38	38
Length, yards			7,450			7,450	7,450
Other				15		15	15
Length, yards				6,860		6,860	6,860
Haul seines	21	1		3		25	186
Length, yards	2,586	125		420		3,131	45,771
Gill nets:							
Drift:							
Barracuda			19	33	20	72	72
Square yards			22,100	237,736	157,310	417,146	417,146
Salmon	157	176				333	2,531
Square yards	144,195	517,440				661,635	5,860,253
Sea bass		16	26			42	42
Square yards		24,992	88,400			113,392	113,392
Shad		105				105	105
Square yards		322,655				322,655	322,655
Striped bass		135				135	135
Square yards		332,640				332,640	332,640
Set:							
Salmon							1,236
Square yards							265,526
Sea bass				46	21	67	67
Square yards				172,929	125,420	298,349	298,349
Other	2	82	132	32	12	260	260
Square yards	1,600	99,920	108,892	36,821	9,740	256,973	256,973
Trammel nets				37	14	51	51
Square yards				280,941	196,668	477,609	477,609
Lines:							
Trawl, set and hand	266	714	1,094	2,632	1,572	6,278	28,606
Hooks	36,728	62,272	156,965	252,582	94,345	602,892	1,102,519
Troll	678	922	569	688	370	3,227	7,237
Hooks	3,111	4,189	2,017	688	370	10,375	28,636
Pound nets							463
Brush weirs							7
Fish wheels							32
Fyke nets		1,505				1,505	1,505
Dip nets	31					31	384
Bag nets, shrimp		13				13	13
Length, yards		8,096				8,096	8,096
Drag, bag nets							37
Length, yards							3,138
Reef nets							6
Paranzella nets		11	4	5		20	20
Yards at mouth		183	67	83		333	333
Beam trawls		25				25	55
Yards at mouth		167				167	371
Traps:							
Crab	506	4,340				4,846	16,026
Crawfish							663
Lobster				4,987	2,226	7,213	7,213
Octupus	10		106			116	116
Harpoons:							
Swordfish and turtles				36	25	61	61
Tongs and rakes	8	27	6			41	383
Shovels	16	43	26	56		141	3,349
Abalone outfits			15	3		18	18
Spears							10
Dredges, oyster							3
Yards at mouth							5

Fisheries of the Pacific Coast States, 1931—Continued

CATCH: BY STATES

Species	Washington		Oregon	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			209	$2
Carp	80,307	$2,409		
Cod [2]	5,891,971	68,129		
Flounders:				
"Sole"	225,405	6,762	7,845	189
Other	109,130	1,713	37,276	745
Grayfish	778,560	2,335		
Halibut	15,039,485	1,073,879	242,897	21,978
Herring, sea	920,699	11,509	45,144	540
"Lingcod"	488,213	14,029	119,986	3,570
Perch	47,851	1,778	31,714	533
Rockfishes	377,616	9,061	90,833	2,077
Sablefish	1,287,616	44,555	63,976	1,540
Salmon	107,448,325	3,244,839	20,491,307	1,054,839
Shad	268,363	5,368	1,384,985	26,111
Skates	344	4		
Smelt	1,824,087	26,481	481,452	14,539
Steelhead trout	1,835,493	87,053	1,728,801	86,350
Striped bass			18,939	1,477
Sturgeon	49,130	1,491	71,056	2,092
Whitebait			15,863	239
Other fish	17,468	355		
Total	136,690,063	4,601,750	24,832,283	1,216,821
SHELLFISH, ETC.				
Crabs	1,273,228	64,726	790,774	38,822
Crawfish			123,000	12,300
Shrimp	68,261	4,096		
Clams:				
Hard	459,472	22,418		
Razor	767,635	141,799	50,572	9,553
Soft			16,413	1,805
Octopus	59,662	2,061		
Oysters:				
Eastern, market	2,650	1,961		
Japanese, market	975,758	129,567		
Native, market	182,197	151,465	5,993	2,854
Scallops, bay	6,384	1,757		
Squid	5,413	244		
Total	3,800,660	520,094	986,755	65,334
Grand total	140,490,723	5,121,844	25,819,038	1,282,155

Species	California [1]		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	307,494	$5,534	307,703	$5,536
Barracuda	4,177,330	362,334	4,177,330	362,334
Cabrilla	227,837	9,403	227,837	9,403
Carp	77,564	4,038	157,871	6,447
Catfish	370,642	47,598	370,642	47,598
Cod [2]	4,920,968	61,020	10,812,939	129,149
Corbina	2,084	96	2,084	96
Dolphin	498	13	498	13
Eels	226	6	226	6
Flounders:				
"California halibut"	962,262	99,732	962,262	99,732
"Sole"	9,418,585	415,526	9,651,835	422,477
Other	662,447	28,651	808,853	31,109
Flyingfish	46,265	1,723	46,265	1,723
Grayfish	595,930	8,980	1,374,490	11,315
Groupers	21,609	804	21,609	804
Hake	12,501	266	12,501	266
Halibut	796,189	55,499	16,078,571	1,151,356
Hardhead	45,943	5,775	45,943	5,775
Herring, sea	685,759	4,026	1,651,602	16,075
Horse mackerel	562,475	16,989	562,475	16,989
Kingfish	413,867	10,397	413,867	10,397
"Lingcod"	1,227,890	47,718	1,836,089	65,317
Mackerel	14,252,866	158,302	14,252,866	158,302
Marlin	24,102	1,050	24,102	1,050
Mullet	24,327	1,852	24,327	1,852

[1] Taken off the Pacific coast, including Latin America.
[2] The cod were taken off Alaska.

Fisheries of the Pacific Coast States, 1931—Continued

CATCH: BY STATES—Continued

Species	California		Total	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*
Perch	225,270	$11,534	304,835	$13,845
Pilchard or sardine	300,204,561	1,185,215	300,204,561	1,185,215
Pompano	5,811	2,590	5,811	2,590
Rock bass	545,575	31,168	545,575	31,168
Rockfishes	7,267,670	249,303	7,736,119	260,441
Rudderfish	40,516	2,658	40,516	2,658
Sablefish	1,021,209	30,268	2,372,801	76,363
Salmon	5,420,943	330,972	133,360,575	4,630,650
Sculpin	91,983	8,280	91,983	8,280
Sea bass:				
Black	500,211	22,420	500,211	22,420
White	1,398,098	115,513	1,398,098	115,513
Shad	851,917	27,963	2,505,265	59,442
Sheepshead	198,347	5,708	198,347	5,708
Skates	174,507	3,541	174,851	3,545
Smelt	1,065,324	56,631	3,370,863	97,651
Spanish mackerel	23,702	2,699	23,702	2,699
Splittail	9,136	526	9,136	526
Squawfish	2,501	120	2,501	120
Steelhead trout			3,564,294	173,403
Striped bass	975,877	94,070	994,816	95,547
Sturgeon			120,186	3,583
Suckers	649	20	649	20
Swordfish	357,747	48,579	357,747	48,579
Tai	1,165	58	1,165	58
Tomcod	3,799	76	3,799	76
Tuna and tunalike fishes:				
Albacore	37,322	2,830	37,322	2,830
Bluefin	3,534,030	168,890	3,534,030	168,890
Bonito	3,079,667	48,637	3,079,667	48,637
Skipjack or striped tuna	16,506,761	504,123	16,506,761	504,123
Yellowfin	36,579,580	1,979,204	36,579,580	1,979,204
Whitebait	140,495	6,721	156,358	6,960
Whitefish	220,428	11,783	220,428	11,783
Yellowtail	2,525,853	83,894	2,525,853	83,894
Other fish	67,006	1,946	84,474	2,301
Total	422,915,320	6,385,272	584,437,666	12,203,843
SHELLFISH, ETC.				
Crabs	2,230,334	230,595	4,294,336	334,143
Crawfish			123,000	12,300
Sea crawfish or spiny lobster	1,340,085	222,657	1,340,085	222,657
Shrimp	1,688,877	26,343	1,757,138	30,439
Abalone	677,580	124,404	677,580	124,404
Clams:				
Cockle	22,048	5,352	22,048	5,352
Hard			459,472	22,418
Pismo	26,209	9,522	26,209	9,522
Razor			818,210	151,352
Soft	32,570	8,266	48,983	10,071
Mixed	8,189	1,556	8,189	1,556
Mussels, sea	140	15	140	15
Octopus	64,601	4,489	124,263	6,550
Oysters:				
Eastern, market	168,916	52,785	171,566	54,746
Japanese, market	58,833	14,684	1,034,591	144,251
Native, market	17,111	8,032	205,301	162,351
Scallops, bay			6,384	1,757
Squid	1,738,621	13,622	1,744,034	13,866
Terrapin	660	110	660	110
Turtles	6,657	506	6,657	506
Total	8,081,431	722,938	12,868,846	1,308,366
Grand total	430,996,751	7,108,210	597,306,512	13,512,209

Industries related to the fisheries of the Pacific Coast States, 1931

OPERATING UNITS, SALARIES, AND WAGES

Item	Washington	Oregon	California	Total
Transporting:	*Number*	*Number*	*Number*	*Number*
Persons engaged	202	50	22	274
Vessels:				
Motor	73	29	4	106
Net tonnage	1,782	315	238	2,335
Wholesale and manufacturing:				
Establishments	113	56	147	316
Persons engaged:				
Proprietors	135	53	208	396
Salaried employees	180	60	537	777
Wage earners:				
Average for season	2,853	796	6,829	10,478
Average for year	1,015	423	2,520	3,958
Paid to salaried employees	$650,245	$192,354	$1,602,649	$2,445,248
Paid to wage earners	1,136,001	444,508	2,724,850	4,305,359
Total salaries and wages	1,786,246	636,862	4,327,499	6,750,607
Fishermen manufacturing	25		124	149

PRODUCTS MANUFACTURED

Item	Washington		Oregon		California	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Barracuda, fresh fillets—pounds					290,000	$53,500
Cabrilla, fresh fillets—do					35,000	5,500
Cod, dry-salted and boneless—do	1,561,586	$165,085			(1)	(1)
Flounders, fresh fillets—do					4,410,000	689,500
Halibut, fresh fillets—do					60,000	18,000
Herring, sea:						
Salted and spiced—do	48,795	6,767				
Smoked—do	270,830	36,200				
Mackerel:						
Smoked—do					53,984	8,098
Canned—standard cases					101,217	239,327
Pilchard:						
Canned, "sardines"—do					1,713,407	4,715,089
Meal—tons					16,319	610,462
Oil—gallons					3,916,336	807,647
Rockfishes, fresh fillets—pounds					1,350,000	219,500
Sablefish, kippered—do	494,396	33,356			(1)	(1)
Salmon:						
Salted—do	538,286	10,898	1,092,087	$21,903	(1)	(1)
Mild-cured—do	4,948,050	673,947	975,250	132,473	915,550	109,875
Kippered—do	1,870,385	219,868			(1)	(1)
Smoked—do	39,928	10,645	53,033	11,178		
Canned:						
Chinook or king—standard cases	112,408	1,297,076	209,064	2,348,350	7,663	77,206
Blueback, red or sockeye—do	93,714	1,423,543	2,245	35,920		
Silver or coho—do	85,004	657,579	29,497	257,884		
Humpback or pink—do	705,528	2,485,047				
Chum or keta—do	67,351	213,544	11,463	34,575		
Steelhead trout—do	4,738	57,349	7,559	98,235		
Eggs for bait—do	4,196	120,544	1,050	28,642		
Meal—tons	1,427	70,988	(1)	(1)		
Oil—gallons	149,891	22,247	(1)	(1)		
Sea bass:						
Black, fresh fillets—pounds					85,000	10,500
White, fresh fillets—do					350,000	75,000
Totuava, fresh fillets—do					200,000	40,000
Shad roe, canned—standard cases	164	4,592	1,080	30,220	(1)	(1)
Tuna and tunalike fishes:						
Yellowtail, fresh fillets—pounds					50,000	9,000
Canned—standard cases					1,216,976	7,279,392
Meal—tons					5,078	169,505
Oil—gallons					15,939	3,296

[1] This item has been included under unclassified products.

Industries related to the fisheries of the Pacific Coast States, 1931—Continued

PRODUCTS MANUFACTURED—Continued

Item	Washington		Oregon		California	
By manufacturing establishments—Contd.						
Crab meat, packaged, fresh-cooked pounds	*Quantity* 128,900	*Value* $51,510	*Quantity* 140,659	*Value* $59,542	*Quantity*	*Value*
Spiny lobster, whole, fresh-cooked do					1,111,500	$259,330
Abalone, steaks do					578,683	185,178
Clams:						
Hard:						
Fresh-shucked gallons	4,569	6,311				
Canned:						
Whole standard cases	11,851	50,435				
Minced do	829	4,711				
Juice and chowder do	2,112	4,833				
Razor, canned:						
Whole, minced, and juice do	40,509	354,011	2,040	17,988		
Marine-shell novelties						38,373
Oysters:						
Japanese:						
Fresh-chucked gallons	[2] 49,788	[2] 95,845	[2] 38,096	[2] 63,084	[1]	[1]
Canned standard cases	7,930	40,805				
Native, fresh-shucked gallons	13,094	102,213	6,130	38,720	[1]	[1]
Shell products:						
Poultry feed tons					23,482	135,399
Unclassified products:						
Salted pounds	[3]	[3]			[4] 1,732,844	[4] 225,514
Smoked do			[3]	[3]	[5] 372,844	[5] 81,200
Canned standard cases	[6] 5,105	[6] 38,019	[3]	[3]	[7] 131,514	[7] 230,370
Meal tons	[3]	[3]	[3]	[3]	[8] 2,313	[8] 114,446
Oil gallons			[3]	[3]	[9] 36,031	[9] 5,822
Miscellaneous		[10] 51,778		[11] 21,602		[12] 581,988
Total		8,309,746		3,200,316		16,978,017
By fishermen:						
Cod, green-salted [13] pounds	1,826,511	68,129			1,525,000	61,020
Shrimp:						
Dried do					40,030	7,205
Cooked do					550,000	27,500
Meal tons					29	580
Total		68,129				96,305
Grand total		8,377,875		3,200,316		17,074,322

[1] This item has been included under unclassified products.
[2] Includes a small amount of fresh-shucked Eastern oysters.
[3] This item has been included under miscellaneous.
[4] Includes salted anchovies, barracuda, corbina, Bismarck herring, mackerel, pilchard, salmon, black sea bass, yellowtail, and yellowfin tuna; mild-cured shad; spiced pilchard; and dry-salted and boneless cod.
[5] Includes smoked pilchard or sardine, and kippered sablefish and salmon.
[6] Includes canned shad, salmon roe and caviar, crabs, cat and dog food, and miscellaneous fish.
[7] Includes canned barracuda and other fish cakes, shad roe, abalone, squid, and cat and dog food.
[8] Includes mackerel, shrimp, kelp and miscellaneous meal, and fish flour.
[9] Includes oil from mackerel and miscellaneous fish.
[10] Includes salted sablefish, sablefish sausage, fresh-shucked scallops, packaged shrimp, salmon-fry meal, and ground clam shells.
[11] Includes canned razor clam juice, shad and crabs; smoked sablefish; and salmon meal and oil.
[12] Includes dried and cooked shrimp; fresh-shucked native, Eastern, and Japanese oysters; oyster-shell lime; glue; agar; and kelp byproducts.
[13] The production of green-salted cod is used in the preparation of dry-salted and boneless cod.

NOTE.—The total value of the products manufactured in the Pacific Coast States was as follows: By manufacturing establishments, $28,488,079; and by fishermen, $164,434. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 149 have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

WASHINGTON

Fisheries of Washington, 1931

CATCH: BY DISTRICTS

Species	Puget Sound district		Coastal district		Columbia River district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp					80,307	$2,409
Cod	5,891,971	$68,129				
Flounders:						
"Sole"	225,405	6,762				
Other	109,130	1,713				
Grayfish	778,560	2,335				
Halibut	15,038,588	1,073,829	897	$50		
Herring	920,699	11,509				
"Lingcod"	473,463	13,881	14,750	148		
Perch	47,573	1,770	278	8		
Rockfishes	335,301	8,849	42,315	212		
Sablefish	1,287,616	44,555				
Salmon:						
Blueback, red or sockeye	6,437,408	517,469	625,212	60,958	129,246	13,573
Chinook or king	10,208,087	658,530	2,359,603	125,841	7,747,834	514,919
Chum or keta	7,001,021	100,114	2,006,052	5,015	838,460	3,145
Humpback or pink	55,935,208	699,191				
Silver or coho	10,320,414	420,940	2,455,047	66,208	1,384,733	58,936
Shad					268,363	5,368
Skates	344	4				
Smelt	160,617	7,528	128,330	5,133	1,535,140	13,820
Steelhead trout	81,414	6,838	168,310	8,405	1,585,769	71,810
Sturgeon	700	38	4,440	133	43,990	1,320
Other fish	17,468	355				
Total	115,270,987	3,644,339	7,805,234	272,111	13,613,842	685,300
SHELLFISH						
Crabs	425,194	20,628	848,034	44,098		
Shrimp	68,261	4,096				
Clams:						
Hard	455,474	22,170	3,998	248		
Razor			767,635	141,799		
Octopus	59,662	2,061				
Oysters:						
Eastern, market			2,650	1,961		
Japanese, market	232,450	29,986	743,308	99,581		
Native, market	153,855	130,967	28,342	20,498		
Scallops	6,384	1,757				
Squid	5,413	244				
Total	1,406,693	211,909	2,393,967	308,185		
Grand total	116,677,680	3,856,248	10,199,201	580,296	13,613,842	685,300

Fisheries of the Puget Sound district of Washington, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines, salmon	Haul seines	Gill nets		Lines		Pound nets	Brush weirs
			Drift, salmon	Set, salmon	Trawl, set, and hand	Troll		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	1,946	13	3		861	184	19	
On boats and shore	14	212	310	8	48	498	155	14
Total	1,960	225	313	8	909	682	174	14
Vessels:								
Steam							1	
Net tonnage							42	
Motor	249	4	2		122	101	4	
Net tonnage	5,952	28	12		3,041	802	119	
Sail					2			
Net tonnage					804			
Total vessels	249	4	2		124	101	5	
Total net tonnage	5,952	28	12		3,845	802	161	
Boats:								
Motor		38	288	3	71	360	19	
Other		35	8	5	122		101	6
Apparatus:								
Number	251	72	296	10	21,989	2,167	104	7
Length, yards	155,118	6,154						
Square yards			490,454	3,480				
Hooks					460,727	9,968		

Fisheries of the Puget Sound district of Washington, 1931—Continued

OPERATING UNITS: By gear—Continued

Item	Dip nets	Drag bag nets	Reef nets	Beam trawls	Traps, crab	Tongs and rakes	Shovels	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				57				2,971
On boats and shore	8	94	18	25	127	89	218	1,653
Total	8	94	18	82	127	89	218	4,624
Vessels:								
Steam				2				3
Net tonnage				29				71
Motor				18				473
Net tonnage				227				9,705
Sail								2
Net tonnage								804
Total vessels				20				478
Total net tonnage				256				10,580
Boats:								
Motor		25	6	10	114	28		893
Other		13	12		7	176		483
Apparatus:								
Number	8	36	6	30	2,413	212	218	
Length, yards		3,078						
Yards at mouth				204				

CATCH: By gear

Species	Purse seines		Haul seines		Gill nets			
					Drift		Set	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"			4,904	$147				
Other			4,082	64				
Grayfish			5,500	16				
Herring			120,310	1,504				
"Lingcod"			600	18			4,085	$134
Perch			39,535	1,471				
Rockfishes			7,293	244			1,790	66
Salmon:								
Blueback, red or sockeye	3,477,437	$281,672	15,778	1,262	7,406	$592		
Chinook or king	713,799	36,404	10,280	730	628,760	44,642		
Chum or keta	5,992,351	85,691	100	1	150,380	2,150		
Humpback or pink	37,124,046	464,051	19,475	243	133,030	1,663		
Silver or coho	3,592,648	147,299	2,256	92	2,587,424	106,084	232	10
Smelt			83,056	3,893				
Steelhead trout	504	42			27	2		
Other fish			11,395	228				
Total	50,900,785	1,015,159	324,564	9,913	3,507,027	155,133	6,107	210
SHELLFISH								
Shrimp			45	3				
Octopus			883	30			585	20
Squid			5,413	244				
Total			6,341	277			585	20
Grand total	50,900,785	1,015,159	330,905	10,190	3,507,027	155,133	6,692	230

Fisheries of the Puget Sound district of Washington, 1931—Continued

CATCH: BY GEAR—Continued

Species	Lines				Pound nets	
	Trawl, set, and hand		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod	5,891,971	$68,129				
Flounders, other					1,820	$29
Grayfish	761,060	2,283				
Halibut	15,002,640	1,071,996	34,978	$1,784	970	49
Herring					298	4
"Lingcod"	425,253	12,321	23,137	740	1,810	59
Rockfishes	293,342	7,446	13,873	416	8,035	269
Sablefish	1,287,586	44,554			30	1
Salmon:						
Blueback, red or sockeye			4,270	342	2,916,256	232,300
Chinook or king			5,428,880	374,593	3,425,224	202,081
Chum or keta					855,660	12,236
Humpback or pink			29,897	374	18,522,140	231,527
Silver or coho			2,196,566	87,863	1,934,984	79,334
Steelhead trout					80,883	6,794
Sturgeon					700	38
Other fish	1,310	31			363	8
Total	23,663,162	1,206,760	7,731,601	466,112	27,749,173	764,729
SHELLFISH						
Octopus	57,448	1,985			132	5
Grand total	23,720,610	1,208,745	7,731,601	466,112	27,749,305	764,734

Species	Brush weirs		Dip nets		Drag bag nets		Reef nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders, other					665	$10		
Herring	758,000	$9,475	3,316	$41	38,775	485		
Perch					7,958	296		
Salmon:								
Blueback, red or sockeye							16,261	$1,301
Chinook or king							1,144	80
Chum or keta							2,530	36
Humpback or pink							106,620	1,333
Silver or coho							6,304	258
Smelt	920	43			76,641	3,592		
Other fish					1,150	23		
Total	758,920	9,518	3,316	41	125,189	4,406	132,859	3,008

Species	Beam trawls		Traps		Tongs and rakes		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"	220,501	$6,615						
Other	102,563	1,610						
Grayfish	12,000	36						
"Lingcod"	18,578	609						
Perch	80	3						
Rockfishes	10,968	408						
Skates	344	4						
Other fish	3,250	65						
Total	368,284	9,350						
SHELLFISH								
Crabs			425,194	$20,628				
Shrimp	68,216	4,093						
Clams, hard							455,474	$22,170
Octopus	614	21						
Oysters:								
Japanese, market					232,450	$29,986		
Native, market					153,855	130,967		
Scallops	6,384	1,757						
Total	75,214	5,871	425,194	20,628	386,305	160,953	455,474	22,170
Grand total	443,498	15,221	425,194	20,628	386,305	160,953	455,474	22,170

Fisheries of the coastal district of Washington, 1931

OPERATING UNITS: BY GEAR—Continued

Item	Gill nets		Lines		Pound nets	Dip nets	Drag bag nets
	Drift, salmon	Set, salmon	Set	Troll			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				10			
On boats and shore	102	160	5	51	44	35	4
Total	102	160	5	61	44	35	4
Vessels:							
Motor				6			
Net tonnage				49			
Boats:							
Motor	86	65	3	34	31		1
Other		104	2		28		
Apparatus:							
Number	86	213	5	184	70	35	1
Length, yards							60
Square yards	159,960	70,290					
Hooks			500	828			

Item	Traps, crab	Tongs and rakes	Shovels	Spears	Dredges	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					6	16
On boats and shore	106	68	2,746	10		3,152
Total	106	68	2,746	10	6	3,168
Vessels:						
Motor					2	8
Net tonnage					17	866
Boats:						
Motor	97	20				318
Other	9	33				174
Apparatus:						
Number	3,718	128	2,746	10	3	
Yards at mouth					5	

CATCH: BY GEAR

Species	Gill nets				Lines			
	Drift		Set [1]		Set		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut							897	$50
"Lingcod"							14,750	148
Perch					278	$8		
Rockfishes					100	1	42,215	211
Salmon:								
Blueback, red or sockeye			625,212	$60,958				
Chinook or king	297,712	$7,443	112,520	2,700			1,633,259	107,795
Chum or keta	377,892	945	358,116	895				
Silver or coho	231,640	4,633	207,260	4,145			1,425,607	45,619
Steelhead trout	4,720	236	154,455	7,723			1,115	45
Sturgeon	4,410	132						
Total	916,374	13,389	1,457,563	76,421	378	9	3,117,843	153,868

Species	Pound nets		Dip nets		Drag bag nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:						
Chinook or king	316,112	$7,903				
Chum or keta	1,270,044	3,175				
Silver or coho	590,540	11,811				
Smelt			103,830	$4,153	24,500	$980
Steelhead trout	8,020	401				
Sturgeon	30	1				
Total	2,184,746	23,291	103,830	4,153	24,500	980

[1] Includes catch by spears.

Fisheries of the coastal district of Washington, 1931—Continued

CATCH: BY GEAR—Continued

Species	Traps		Dredges, tongs and rakes		Shovels	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	848,034	$44,098				
Clams:						
Hard					3,998	$248
Razor					767,635	141,799
Oysters:						
Eastern, market			2,650	$1,961		
Japanese, market			743,308	99,581		
Native, market			28,342	20,498		
Total	848,034	44,098	774,300	122,040	771,633	142,047

Fisheries of the Columbia River district of Washington, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Fish wheels	Dip nets	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Set	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					2				2
On boats and shore	416	680	82	29	84	138	21	132	1,478
Total	416	680	82	29	86	138	21	132	1,480
Vessels:									
Motor					1				1
Net tonnage					20				20
Boats:									
Motor	34	506	49	22	67	94		70	775
Other	47		33	7		71			148
Apparatus:									
Number	47	506	201	81	286	240	32	132	
Length, yards	14,133								
Square yards		1,224,760	48,441						
Hooks				8,100	1,287				

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines, set	
			Drift		Set			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	80,307	$2,409						
Salmon:								
Blueback, red or sockeye	14,660	1,539	33,823	$3,551	2,559	$269		
Chinook or king	1,386,416	92,197	3,453,608	228,629	91,061	6,037		
Chum or keta	503	2	420,838	1,578	7,078	27		
Silver or coho	3,944	197	116,693	5,835	2,741	137		
Shad	138,101	2,762	64,837	1,297	34	1		
Smelt			79,553	2,466				
Steelhead trout	227,399	10,801	351,213	13,170	25,694	1,220		
Sturgeon	997	30	22,017	661	342	10	5,577	$167
Total	1,852,327	109,937	4,542,582	257,187	129,509	7,701	5,577	167

Fisheries of the Columbia River district of Washington, 1931—Continued

CATCH: BY GEAR—Continued

Species	Lines, troll		Pound nets		Fish wheels		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:								
Blueback, red or sockeye			43,231	$4,539	21,947	$2,307	13,026	$1,368
Chinook or king	60,637	$4,245	2,279,062	150,418	200,086	14,006	276,964	19,387
Chum or keta			410,041	1,538				
Silver or coho	514,911	15,447	741,786	37,089			4,658	231
Shad			38,195	764	27,196	544		
Smelt							1,455,587	11,354
Steelhead trout			941,704	44,731	7,988	379	31,771	1,509
Sturgeon			9,170	275	5,823	175	64	2
Total	575,548	19,692	4,463,189	239,354	263,040	17,411	1,782,070	33,851

OREGON

Fisheries of Oregon, 1931

CATCH: BY DISTRICTS

Species	Columbia River district		Coastal district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			209	$2
Flounders:				
"Sole"	5,275	$138	2,570	51
Other			37,276	745
Halibut	107,842	11,469	135,055	10,509
Herring			45,144	540
"Lingcod"	27,824	787	92,162	2,783
Perch			31,714	533
Rockfishes	27,002	753	63,831	1,324
Sablefish	13,455	355	50,521	1,185
Salmon:				
Blueback, red or sockeye	123,765	12,995		
Chinook or king	12,581,170	834,556	1,316,258	62,763
Chum or keta	379,205	1,421	1,169,363	5,554
Silver or coho	1,532,380	51,060	3,389,166	86,490
Shad	590,190	11,805	794,795	14,306
Smelt	472,453	14,196	8,999	343
Steelhead trout	1,390,356	66,043	338,445	20,307
Striped bass			18,939	1,477
Sturgeon	68,866	2,068	2,190	24
White bait			15,863	239
Total	17,319,783	1,007,646	7,512,500	209,175
SHELLFISH				
Crabs			790,774	38,822
Crawfish	123,000	12,300		
Clams:				
Razor			50,575	9,553
Soft			16,413	1,805
Oysters, native, market			5,993	2,854
Total	123,000	12,300	863,755	53,034
Grand total	17,442,783	1,019,946	8,376,255	262,209

Fisheries of the Columbia River district of Oregon, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Dip nets	Traps, crawfish	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Trawl and set	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				8	24				32
On boats and shore	507	1,191	57	42	234	28	178	39	2,209
Total	507	1,191	57	50	258	28	178	39	2,241
Vessels:									
Motor				2	13				15
Net tonnage				34	129				163
Boats:									
Motor	25	886	54	32	180	18		25	1,185
Other	43		3	10		14		14	76
Apparatus:									
Number	39	886	141	103	860	49	178	663	
Length, yards	21,860								
Square yards		2,790,900	35,955						
Hooks				11,550	3,870				

CATCH: BY GEAR

Species	Haul seines		Gill nets		Lines			
					Trawl and set		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders, "Sole"					5,275	$138		
Halibut					107,842	11,469		
"Lingcod"					27,824	787		
Rockfishes					27,002	753		
Sablefish					13,455	355		
Salmon:								
Blueback, red or sockeye	34,389	$3,611	60,802	$6,384				
Chinook or king	2,205,281	146,430	9,367,847	619,215			141,732	$9,921
Chum or keta	2,457	9	326,682	1,225				
Silver or coho	11,529	576	121,322	6,066			1,278,018	38,341
Shad	407,687	8,154	169,249	3,385				
Smelt			452,915	14,040				
Steelhead trout	541,510	25,723	472,619	22,449			155	8
Sturgeon	2,658	80	52,823	1,585	9,436	285		
Total	3,205,511	184,583	11,024,259	674,349	190,834	13,787	1,419,905	48,270

Species	Pound nets		Dip nets		Traps	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon:						
Blueback, red or sockeye	17,528	$1,840	11,046	$1,160		
Chinook or king	434,686	28,776	431,624	30,214		
Chum or keta	18,880	70	31,186	117		
Silver or coho	118,755	5,939	2,756	138		
Shad	12,928	259	326	7		
Smelt			19,538	156		
Steelhead trout	337,096	16,012	38,976	1,851		
Sturgeon	511	15	3,438	103		
SHELLFISH						
Crawfish					123,000	$12,300
Total	940,384	52,911	538,890	33,746	123,000	12,300

Fisheries of the coastal district of Oregon, 1931

OPERATING UNITS: By gear

Item	Haul seines	Gill nets		Lines		Traps, crab	Tongs	Shovels	Total, exclusive of duplication
		Drift, salmon	Set, salmon	Trawl and set	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				23	11				34
On boats and shore	9	537	245		137	153	2	244	1,212
Total	9	537	245	23	148	153	2	244	1,246
Vessels:									
Motor				6	6				12
Net tonnage				58	44				102
Boats:									
Motor	3	418	141		115	134	1		759
Other	1	6	104			19	2		116
Apparatus:									
Number	3	424	671	150	513	5,049	2	244	
Length, yards	493								
Square yards		532,544	107,360						
Hooks				18,750	2,308				

CATCH: By gear

Species	Haul seines		Gill nets		Lines			
					Trawl and set		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	209	$2						
Flounders:								
"Sole"			2,305	$46	265	$5		
Other	3,367	67	27,290	546	6,619	132		
Halibut					134,778	10,488	277	$21
Herring	8,012	95	37,132	445				
"Lingcod"					64,421	1,951	27,741	832
Perch	11,622	232	20,092	301				
Rockfishes	1,011	22	129	4	52,820	1,101	9,871	197
Sablefish					50,521	1,185		
Salmon:								
Chinook or king			1,221,553	56,802			94,705	5,961
Chum or keta			1,169,363	5,554				
Silver or coho			2,288,854	54,017			1,100,312	32,473
Shad			794,795	14,306				
Smelt	119	5	8,880	338				
Steelhead trout			338,445	20,307				
Striped bass			18,939	1,477				
Sturgeon			2,190	24				
White bait	6,604	100	9,259	139				
Total	30,944	523	5,939,226	154,306	309,424	14,862	1,232,906	39,484

Species	Traps		Tongs		Shovels	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	790,774	$38,822				
Clams:						
Razor					50,575	$9,553
Soft					16,413	1,805
Oysters, native, market			5,993	$2,854		
Total	790,774	38,822	5,993	2,854	66,988	11,358

CALIFORNIA

Fisheries of California, 1931

CATCH: BY DISTRICTS

Species	Northern district		San Francisco district		Monterey district		Southern district—Off California—San Pedro division	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			164,657	$2,973	104,810	$1,650	37,787	$906
Barracuda			8,270	365	139,835	5,927	2,093,832	188,365
Carp			37,055	834			40,509	3,204
Catfish			370,642	47,598				
Cod			4,920,968	61,020				
Dolphin							498	13
Eels			86	3			140	3
Flounders:								
"California halibut"					16,251	1,751	817,221	82,956
"Sole"	7,323,590	$329,559	1,196,887	50,868	535,990	21,321	360,060	13,550
Other	379,319	15,423	212,706	8,162	58,905	2,547	11,517	2,519
Flyingfish							46,265	1,723
Grayfish	27,235	272	90,560	906	5,154	62	289,435	6,747
Hake	420	8	11,796	236			285	22
Halibut	790,352	54,990	5,837	509				
Hardhead			45,943	5,775				
Herring	17,819	274	634,012	3,302	16,236	163	99	5
Horse mackerel					248,491	6,899	313,984	10,090
Kingfish			4,358	153	141,772	5,373	263,639	4,793
"Lingcod"	791,018	27,733	297,442	13,385	134,985	6,367	4,445	233
Mackerel			2,364	72	1,255,687	38,510	12,781,138	115,878
Marlin							24,102	1,050
Mullet							8,350	569
Perch	9,787	355	92,826	3,369	36,155	1,449	86,169	6,345
Pilchard or sardine			50,661,534	166,494	153,431,686	617,673	95,979,175	399,821
Pompano			20	8	731	259	3,996	2,130
Rock bass							337,502	21,071
Rockfishes	455,693	14,982	638,694	22,911	2,616,652	87,055	2,664,753	90,659
Rudderfish							40,317	2,644
Sablefish	701,959	21,743	61,932	1,858	237,817	5,744	19,501	923
Salmon	3,940,754	229,866	1,387,370	93,365	92,819	7,741		
Sculpin			624	9	422	6	78,422	7,242
Sea bass:								
Black					55	2	112,328	5,278
White			23,663	1,918	40,087	3,165	783,503	71,602
Shad			851,897	27,961			20	2
Sheepshead							171,408	4,888
Skates	39,844	797	85,415	1,708	13,551	284	34,148	718
Smelt	58,379	2,433	236,106	12,994	367,703	29,379	386,248	11,393
Splittail			9,136	526				
Squawfish			2,501	120				
Striped bass			975,877	94,070				
Suckers			649	20				
Swordfish							211,399	28,906
Tomcod	2,465	49	1,334	27				
Tuna and tunalike fishes:								
Albacore			7	1	30,080	2,151	7,235	678
Bluefin							2,355,088	121,314
Bonito					12,093	472	2,777,302	44,318
Skipjack or striped tuna							7,616,823	231,181
Yellowfin							99,113	7,474
Whitebait	128,505	6,050	10,192	615	1,798	56		
Whitefish							97,787	6,095
Yellowtail							727,105	21,328
Other fish	31,753	652	6,449	138	14,163	301	13,438	806
Total	14,698,892	705,186	63,049,809	624,273	159,553,928	846,307	131,696,086	1,519,442
SHELLFISH, ETC.								
Crabs	111,672	9,883	2,115,763	220,391	2,843	318	56	3
Sea crawfish or spiny lobster							248,393	41,179
Shrimp			1,684,763	25,271	4,114	1,072		
Abalone					642,165	115,932	35,415	8,472
Clams:								
Cockle	128	30	13,300	3,289			8,620	2,033
Pismo					4,128	1,381	22,081	8,141
Soft	72	13	32,479	8,251	19	2		
Mixed	7,522	1,342	667	214				

Fisheries of California, 1931—Continued

CATCH: BY DISTRICTS—Continued

Species	Northern district		San Francisco district		Monterey district		Southern district—Off California—San Pedro division	
SHELLFISH, ETC.—con.	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mussels	125	$13			15	$2		
Octopus	2,012	161	3,852	$270	58,412	4,018	325	$40
Oysters:								
Eastern, market			168,916	52,785				
Japanese, market					58,833	14,684		
Native, market	7,712	3,535	9,399	4,497				
Squid					1,706,671	12,311	31,950	1,311
Terrapin			660	110				
Total	129,243	14,977	4,029,799	315,078	2,477,200	149,720	346,840	61,179
Grand total	14,828,135	720,163	67,079,608	939,351	162,031,128	996,027	132,042,926	1,580,621

Species	Southern district—Off California—San Diego division		Southern district—Off Latin America				Total, southern district	
			San Pedro division		San Diego division			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	240	$5					38,027	$911
Barracuda	1,108,496	51,325	652,128	$102,240	174,769	$14,112	4,029,225	356,042
Cabrilla			101,749	4,386	126,088	5,017	227,837	9,403
Carp							40,509	3,204
Corbina			2,084	96			2,084	96
Dolphin							498	13
Eels							140	3
Flounders:								
"California halibut"	88,441	10,902	1,634	110	38,715	4,013	946,011	97,981
"Sole"	2,058	228					362,118	13,778
Other							11,517	2,519
Flyingfish							46,265	1,723
Grayfish	180,176	987	25	1	3,345	5	472,981	7,740
Groupers			452	14	21,157	790	21,609	804
Hake							285	22
Herring	17,593	282					17,692	287
Horse mackerel							313,984	10,090
Kingfish	1,465	38	2,633	40			267,737	4,871
"Lingcod"							4,445	233
Mackerel	213,524	3,839	153	3			12,994,815	119,720
Marlin							24,102	1,050
Mullet	8,815	709	4,515	316	2,647	258	24,327	1,852
Perch	333	16					86,502	6,361
Pilchard or sardines	132,166	1,227					96,111,341	401,048
Pompano	326	105			738	88	5,060	2,323
Rock bass	172,311	7,577	22,339	1,436	13,423	1,084	545,575	31,168
Rockfishes	887,874	33,538	822	31	3,182	127	3,556,631	124,355
Rudderfish			199	14			40,516	2,658
Sablefish							19,501	923
Sculpin	12,400	1,014			115	9	90,937	8,265
Sea bass:								
Black	142,202	5,912	114,953	5,699	130,673	5,529	500,156	22,418
White	209,942	14,300	137,567	9,686	203,336	14,842	1,334,348	110,430
Shad							20	2
Sheepshead	25,649	781			1,290	39	198,347	5,708
Skates	1,549	34					35,697	752
Smelt	16,791	429	88	2	9	1	403,136	11,825
Spanish mackerel			18,780	2,487	4,922	212	23,702	2,699
Swordfish	145,983	19,662	365	11			357,747	48,579
Tai					1,165	58	1,165	58
Tuna and tunalike fishes:								
Albacore							7,235	678
Bluefin	3,168	228	1,168,263	47,001	7,511	347	3,534,030	168,890
Bonito	225,122	2,823	64,492	1,004	658	20	3,067,574	48,165
Skipjack or striped tuna	4,348,793	129,565	2,185,289	66,846	2,355,856	76,531	16,506,761	504,123
Yellowfin	56,052	2,933	12,992,690	668,497	23,431,725	1,300,300	36,579,580	1,979,204
Whitefish	109,212	4,945	10,670	617	2,759	126	220,428	11,783
Yellowtail	980,636	22,327	466,555	24,273	351,557	15,966	2,525,853	83,894
Other fish	353	15	850	34			14,641	855
Total	9,091,670	315,746	17,949,295	934,844	26,875,640	1,439,474	185,612,691	4,209,506

Fisheries of California, 1931—Continued

CATCH: BY DISTRICTS—Continued

Species	Southern district—Off California—San Diego division		Southern district—Off Latin America				Total, southern district	
			San Pedro division		San Diego division			
SHELLFISH, ETC.	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs							56	$3
Sea crawfish or spiny lobster	134, 218	$21, 353	1, 799	$353	955, 675	$159, 772	1, 340, 085	222, 657
Abalone							35, 415	8, 472
Clams:								
Cockle							8, 620	2, 033
Pismo							22, 081	8, 141
Octopus							325	40
Squid							31, 950	1, 311
Turtles					6, 657	506	6, 657	506
Total	134, 218	21, 353	1, 799	353	962, 332	160, 278	1, 445, 189	243, 163
Grand total	9, 225, 888	337, 099	17, 951, 094	935, 197	27, 837, 972	1, 599, 752	187, 057, 880	4, 452, 669

CATCH: BY WATERS

Species	Off California [1]		Off Latin America	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	307, 494	$5, 534		
Barracuda	3, 350, 433	245, 982	826, 897	$116, 352
Cabrilla			227, 837	9, 403
Carp	77, 564	4, 038		
Catfish	370, 642	47, 598		
Cod	4, 920, 968	61, 820		
Corbina			2, 084	96
Dolphin	498	13		
Eels	226	6		
Flounders:				
"California halibut"	921, 913	95, 609	40, 349	4, 123
"Sole"	9, 418, 585	415, 526		
Other	662, 447	28, 651		
Flyingfish	46, 265	1, 723		
Grayfish	592, 560	8, 974		
Groupers			3, 370	6
Hake	12, 501	266	21, 609	804
Halibut	796, 189	55, 499		
Hardhead	45, 943	5, 775		
Herring	685, 759	4, 026		
Horse mackerel	562, 475	16, 989		
Kingfish	411, 234	10, 357	2, 633	40
"Lingcod"	1, 227, 890	47, 718		
Mackerel	14, 252, 713	158, 299	153	3
Marlin	24, 102	1, 050		
Mullet	17, 165	1, 278	7, 162	574
Perch	225, 270	11, 534		
Pilchard	300, 204, 561	1, 185, 215		
Pompano	5, 073	2, 502	738	88
Rock bass	509, 813	28, 648	35, 762	2, 520
Rockfish	7, 263, 666	249, 145	4, 004	158
Rudderfish	40, 317	2, 644	199	14
Sablefish	1, 021, 209	30, 268		
Salmon	5, 420, 943	330, 972		
Sculpin	91, 868	8, 271	115	9
Sea bass:				
Black	254, 585	11, 192	245, 626	11, 228
White	1, 057, 195	90, 985	340, 903	24, 528
Shad	851, 917	27, 963		
Sheepshead	197, 057	5, 669	1, 290	39
Skates	174, 507	3, 541		
Smelt	1, 065, 227	56, 628	97	3
Spanish mackerel			23, 702	2, 699
Splittail	9, 136	526		
Squawfish	2, 501	120		
Striped bass	975, 877	94, 070		
Suckers	649	20		

[1] The catch of cod was taken in Alaska waters.

Fisheries of California, 1931—Continued

CATCH: BY WATERS—Continued

Species	Off California		Off Latin America	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*
Swordfish	357,382	$48,568	365	$11
Tai			1,165	58
Tomcod	3,799	76		
Tuna and tunalike fishes:				
Albacore	37,322	2,830		
Bluefin	2,358,256	121,542	1,175,774	47,348
Bonito	3,014,517	47,613	65,150	1,024
Skipjack or striped tuna	11,965,616	360,746	4,541,145	143,377
Yellowfin	155,165	10,407	36,424,415	1,968,797
Whitebait	140,495	6,721		
Whitefish	206,999	11,040	13,429	743
Yellowtail	1,707,741	43,655	818,112	40,239
Other fish	66,156	1,912	850	34
Total	378,090,385	4,010,954	44,824,935	2,374,318
SHELLFISH, ETC.				
Crabs	2,230,334	230,595		
Sea crawfish	382,611	62,532	957,474	160,125
Shrimp	1,688,877	26,343		
Abalone	677,580	124,404		
Clams:				
Cockle	22,048	5,352		
Pismo	26,209	9,522		
Soft	32,570	8,266		
Mixed	8,189	1,556		
Mussels	140	15		
Octopus	64,601	4,489		
Oysters:				
Eastern, market	168,916	52,785		
Japanese, market	58,833	14,684		
Native, market	17,111	8,032		
Squid	1,738,621	13,622		
Terrapin	660	110		
Turtles			6,657	506
Total	7,117,300	562,307	964,131	160,631
Grand total	385,207,685	4,573,261	45,789,066	2,534,949

Fisheries of the northern district of California, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines	
		Drift, salmon	Other	Set and hand	Troll
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				14	10
On boats and shore	40	237	2	91	176
Total	40	237	2	105	186
Vessels:					
Motor				5	5
Net tonnage				41	38
Boats:					
Motor	17		2	63	149
Other	4	157			
Apparatus:					
Number	21	157	2	266	678
Length, yards	2,586				
Square yards		144,195	1,600		
Hooks				36,728	3,111

Fisheries of the northern district of California, 1931—Continued

OPERATING UNITS: By gear—Continued

Item	Dip nets	Traps		Rakes	Shovels	Total, exclusive of duplication
		Crab	Octopus			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						16
On boats and shore	31	35	1	8	16	470
Total	31	35	1	8	16	486
Vessels:						
Motor						6
Net tonnage						58
Boats:						
Motor		27	1			154
Other		1				158
Apparatus:						
Number	31	506	10	8	16	

CATCH: By gear

Species	Haul seines		Gill nets		Lines, set and hand	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:						
"Sole"			30	$1	215	$7
Other	4,299	$495	4,231	96	64	3
Halibut					726,411	50,564
Herring	17,646	269	173	5		
"Lingcod"	23	1			208,089	5,027
Perch	8,329	308			64	4
Rockfishes					102,255	2,654
Sablefish					604,525	18,819
Salmon	18,014	593	576,278	24,296		
Smelt	42,293	1,914	266	11		
Whitebait			68	3		
Other fish					5,780	132
Total	90,604	3,580	581,046	24,412	1,647,403	77,210

Species	Lines, troll		Dip nets		Paranzella nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:						
"Sole"					7,323,345	$329,551
Other					370,725	14,829
Grayfish					27,235	272
Hake					420	8
Halibut	8,595	$552			55,346	3,874
"Lingcod"	31,510	649			551,396	22,056
Perch			1,394	$43		
Rockfishes	3,223	70			350,215	12,258
Sablefish	17	1			97,417	2,923
Salmon	3,346,462	204,977				
Skates					39,844	797
Smelt			15,820	508		
Tomcod					2,465	49
Whitebait			128,437	6,047		
Other fish	551	12			24,422	508
Total	3,390,358	206,261	145,651	6,598	8,843,830	387,125
SHELLFISH						
Octopus					80	6
Grand total	3,390,358	206,261	145,651	6,598	8,843,910	387,131

Note.—The catch by paranzella nets was made entirely by fishermen from the San Francisco district.

Fisheries of the northern district of California, 1931—Continued

CATCH: BY GEAR—Continued

Species	Traps		Shovels		Rakes	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	111,672	$9,883				
Clams:						
Cockle			128	$30		
Soft			72	13		
Mixed			7,522	1,342		
Mussels					125	$13
Octopus	1,932	155				
Oysters, native, market					7,712	3,535
Total	113,604	10,038	7,722	1,385	7,837	3,548

Fisheries of the San Francisco district of California, 1931

OPERATING UNITS: BY GEAR

Item	Lampara nets, sardine	Haul seines	Gill nets					Lines	
			Drift, salmon	Drift, sea bass	Drift, shad	Drift, striped bass	Other	Set and hand	Troll
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	66							89	35
On boats and shore	39	3	315	20	175	233	94	273	245
Total	105	3	315	20	175	233	94	362	280
Vessels:									
Motor	6							3	14
Net tonnage	70							33	195
Sail								2	
Net tonnage								824	
Total	6							5	14
Net tonnage	70							857	195
Boats:									
Motor	7		172	14	101	128	51	132	243
Other		1	4	2	4	7	6	57	
Apparatus:									
Number	13	1	176	16	105	135	82	714	922
Length, yards	2,210	125							
Square yards			517,440	24,992	322,655	332,640	99,920		
Hooks								62,272	4,189

Item	Fyke nets	Bag nets, shrimp	Paranzella nets	Beam trawls	Traps, crab	Tongs	Rakes	Shovels	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		19	104						265
On boats and shore	83	32		25	224	6	21	43	938
Total	83	51	104	25	224	6	21	43	1,203
Vessels:									
Steam			1						1
Net tonnage			32						32
Motor		4	21						30
Net tonnage		26	306						396
Sail									2
Net tonnage									824
Total		4	22						33
Net tonnage		26	338						1,252
Boats:									
Motor	33	9		25	216	3			557
Other	33				3	6	6	4	109
Apparatus:									
Number	1,505	13	11	25	4,340	6	21	43	
Length, yards		8,096							
Yards at mouth			183	167					

Fisheries of the San Francisco district of California, 1931—Continued

CATCH: BY GEAR

Species	Lampara nets		Haul seines		Gill nets		Lines, set and hand	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	163,012	$2,943			1,645	$30		
Barracuda	8,270	365						
Carp			7,300	$194	23,394	504	155	$3
Catfish					31	4	39,108	5,363
Cod							4,920,968	61,020
Eels							86	3
Flounders:								
"Sole"							5,509	234
Other	383	15			620	27	1,652	62
Grayfish	35	1			402	4	16,220	162
Halibut					32	3	559	47
Hardhead			31,498	3,897				
Herring	150	1			633,862	3,301		
Kingfish	3,942	138					155	6
"Lingcod"	51	2			347	14	268,047	12,144
Mackerel	2,269	68			10	1	85	3
Perch	2,751	100			90,075	3,269		
Pilchard or sardine	50,661,384	166,493			150	1		
Pompano	20	8						
Rockfishes							564,161	20,238
Sablefish							53,858	1,616
Salmon					949,959	65,133		
Sculpin							624	9
Sea bass: White	1,793	167			20,895	1,692	13	1
Shad					851,897	27,961		
Smelt	7,176	403			228,930	12,591		
Splittail			435	32	14	1		
Squawfish					1,185	57	26	1
Striped bass					765,813	73,444	208,714	20,429
Tomcod	269	5			26	1		
Whitebait	7,930	480			2,262	135		
Other fish					500	20	298	6
Total	50,859,435	171,189	39,233	4,123	3,572,049	188,193	6,080,238	121,347
SHELLFISH								
Octopus							3,817	267
Grand total	50,859,435	171,189	39,233	4,123	3,572,049	188,193	6,084,055	121,614

Species	Lines, troll		Fyke nets		Bag nets		Paranzella nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp			6,206	$133				
Catfish			331,503	42,231				
Flounders:								
"Sole"							1,191,378	$50,634
Other							210,051	8,058
Grayfish	1,275	$13					72,628	726
Hake							11,796	236
Halibut	564	38					4,682	421
Hardhead			14,445	1,878				
Kingfish							261	9
"Lingcod"	3,535	79					25,462	1,146
Rockfishes	523	18					74,010	2,655
Sablefish							8,074	242
Salmon	437,411	28,232						
Sea bass: White	962	58						
Skates							85,415	1,708
Splittail			8,687	493				
Squawfish			1,290	62				
Striped bass			721	71				
Suckers			649	20				
Tomcod							1,039	21
Tuna and tunalike fishes, albacore	7	1						
Other fish							5,651	112
Total	444,277	28,439	363,501	44,888			1,690,447	65,968
SHELLFISH								
Crabs							1,046	108
Shrimp					948,680	$14,230		
Octopus							35	3
Terrapin			660	110				
Total			660	110	948,680	14,230	1,081	111
Grand total	444,277	28,439	364,161	44,998	948,680	14,230	1,691,528	66,079

Fisheries of the San Francisco district of California, 1931—Continued

CATCH: BY GEAR—Continued

Species	Beam trawls		Traps		Tongs and rakes		Shovels	
FISH								
Striped bass	*Pounds* 629	*Value* $126	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
SHELLFISH								
Crabs			2,114,717	$220,283				
Shrimp	736,083	11,041						
Clams:								
Cockle							13,300	$3,289
Soft							32,479	8,251
Mixed							667	214
Oysters:								
Eastern, market					168,916	$52,785		
Native, market					9,399	4,497		
Total	736,083	11,041	2,114,717	220,283	178,315	57,282	46,446	11,754
Grand total	736,712	11,167	2,114,717	220,283	178,315	57,282	46,446	11,754

Fisheries of the Monterey district of California, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines, sardine	Lampara nets		Gill nets			Lines	
		Sardine	Squid	Drift, barracuda	Drift, sea bass	Other	Set and hand	Troll
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	127	343	63			3	8	1
On boats and shore		316	169	29	41	132	229	160
Total	127	659	232	29	41	135	237	161
Vessels, motor	12	28	10			1	3	1
Net tonnage	504	338	102			6	18	6
Boats:								
Motor		26	28	18	26	65	180	158
Other				1		18	33	
Apparatus:								
Number	12	54	38	19	26	132	1,094	569
Length, yards	4,350	17,350	7,450					
Square yards				22,100	88,400	108,892		
Hooks							156,965	2,017

Item	Paranzella nets	Traps, octopus	Rakes	Shovels	Abalone outfits	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	11				65	519
On boats and shore	24	6	6	26	10	680
Total	35	6	6	26	75	1,199
Vessels, motor	2				13	50
Net tonnage	28				106	859
Boats:						
Motor	6	6			2	227
Other						45
Apparatus:						
Number	4	106	6	26	15	
Yards at mouth	67					

Fisheries of the Monterey district of California, 1931—Continued

CATCH: BY GEAR

Species	Purse seines		Lampara nets		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			103,436	$1,628	1,374	$22
Barracuda			104,208	4,417	35,525	1,506
Flounders:						
"California halibut"			959	103	12,053	1,298
"Sole"			118	5	693	29
Other					2,020	69
Grayfish					1,147	22
Herring	15,986	$160	250	3		
Horse mackerel			240,910	6,688	7,090	197
Kingfish			61,601	2,335	74,690	2,831
"Lingcod"			20	1	648	31
Mackerel	934	28	145,857	4,473	499	15
Perch			15,782	631	17,262	688
Pilchard or sardine	63,227,529	252,910	90,197,996	364,701	6,161	62
Pompano			698	247	33	12
Rockfishes			943	42	478	18
Sablefish					50	1
Sculpin					140	2
Sea bass:						
Black			30	1	25	1
White			6,497	513	33,444	2,640
Skates			35	1	2,418	53
Smelt	130	10	50,980	4,074	312,737	24,989
Tuna and tunalike fishes: Bonito	130	5	9,481	370	2,422	95
Whitebait			213	7	1,585	49
Other fish			1,300	52		
Total	63,244,709	253,113	90,941,314	390,292	512,494	34,630
SHELLFISH						
Squid			1,703,018	12,146	3,653	165
Grand total	63,244,709	253,113	92,644,332	402,438	516,147	34,795

Species	Lines				Paranzella nets	
	Set and hand		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda			102	$4		
Flounders:						
"California halibut"	1,547	$167	22	2	1,670	$181
"Sole"	23,069	964			512,110	20,323
Other	5,042	215			51,843	2,263
Grayfish					4,007	40
Horse mackerel	491	14				
Kingfish	4,622	175			859	32
"Lingcod"	131,398	6,194	183	9	2,699	130
Mackerel	1,107,906	33,979	491	15		
Perch	3,111	130				
Rockfishes	2,557,710	84,690	116	5	57,267	2,294
Sablefish	237,372	5,733			395	10
Salmon			92,819	7,741		
Sculpin	282	4				
Sea bass, white	40	3	100	8	6	1
Skates	2,695	59			8,403	171
Smelt	3,721	295			135	11
Tuna and tunalike fishes:						
Albacore			30,080	2,151		
Bonito			60	2		
Other fish	2,921	68			9,942	181
Total	4,081,927	132,690	123,973	9,937	649,336	25,637
SHELLFISH						
Crabs					2,843	318
Octopus	5,379	370			21	1
Total	5,379	370			2,864	319
Grand total	4,087,306	133,060	123,973	9,937	652,200	25,956

Fisheries of the Monterey district of California, 1931—Continued

CATCH: BY GEAR—Continued

Species	Traps		Shovels and rakes		Abalone outfits	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"Lingcod"	37	$2				
Rockfishes	138	6				
Total	175	8				
SHELLFISH						
Shrimp	4,114	1,072				
Abalone					642,165	$115,932
Clams:						
Pismo			4,128	$1,381		
Soft			19	2		
Mussels			15	2		
Octopus	53,012	3,647				
Oysters, Japanese, market			58,833	14,684		
Total	57,126	4,719	62,995	16,069	642,165	115,932
Grand total	57,301	4,727	62,995	16,069	642,165	115,932

Fisheries of the San Pedro division of the southern district of California, 1931

OPERATING UNITS: BY GEAR

Item	Purse seines			Lampara nets			Haul seines	Gill nets		
	Barracuda	Sardine	Tuna	Mackerel	Sardine	Other		Drift, barracuda	Set, sea bass	Other
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	281	588	713	269	373	69		21	13	10
On boats and shore				27		34	8	64	88	44
Total	281	588	713	296	373	103	8	85	101	54
Vessels, motor	31	58	71	32	35	7		7	4	3
Net tonnage	882	2,522	2,989	357	933	132		41	35	30
Boats:										
Motor				4		8	2	26	39	20
Other							1		3	9
Apparatus:										
Number	31	58	71	36	35	15	3	33	46	32
Length, yards	13,672	24,081	40,500	14,738	15,400	6,860	420			
Square yards								237,736	172,929	36,821

Item	Trammel nets	Lines		Paranzella nets	Traps, lobster	Harpoons, swordfish	Shovels	Abalone outfits	Total, exclusive of duplication
		Set and hand	Troll						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	31	852		20	43	29		5	1,795
On boats and shore	65	458	151	12	177	48	56	5	770
Total	96	1,310	151	32	220	77	56	10	2,565
Vessels, motor	11	137		6	16	8		1	233
Net tonnage	75	4,576		84	176	84		9	7,387
Boats:									
Motor	25	282	129	4	111	28		2	401
Other	1	33			13				51
Apparatus:									
Number	37	2,632	688	5	4,987	36	56	3	
Square yards	280,941								
Yards at mouth				83					
Hooks		252,582	688						

Fisheries of the San Pedro division of the southern district of California, 1931—Con.

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara nets		Haul seines		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			37,747	$905			40	$1
Barracuda	655,398	$61,633	444,175	73,262			175,109	12,760
Carp					40,509	$3,204		
Eels			100	2			40	1
Flounders:								
"California halibut"	58	6	1,867	229			877	90
"Sole"	100	4					88	4
Other							28	1
Flyingfish	575	11	2,360	97			43,330	1,615
Grayfish	592	18	17,498	381			40,876	928
Herring			20	1			79	4
Horse mackerel	27,956	999	281,536	8,950			1,140	33
Kingfish			240,641	4,351			670	12
Mackerel	749,775	3,337	10,356,099	93,938	54	1	24,607	262
Mullet					5,551	295	2,799	274
Perch	707	43	70,017	5,295	168	15	12,092	800
Pilchard or sardine	63,380,560	253,523	32,598,189	146,292			426	6
Pompano			3,978	2,120			18	10
Rock bass	3,419	139	10,240	577			4,055	219
Rockfishes			576	20			431	17
Rudderfish	1,582	88	8,146	536			30,571	2,019
Sculpin			1,231	109			1,119	101
Sea bass:								
Black	476	24	1,126	55			9,286	396
White	230,043	20,117	67,426	7,982	205	25	453,795	39,980
Shad			20	2				
Sheepshead	235	7	345	10			903	28
Skates							531	9
Smelt	2,072	38	287,207	8,466	58,474	1,254	36,078	1,557
Tuna and tunalike fishes:								
Albacore	942	103						
Bluefin	2,256,429	116,376	98,294	4,908			41	3
Bonito	2,482,812	39,406	92,048	1,529	65	2	33,723	621
Skipjack or striped tuna	452,607	14,356						
Yellowfin	49,210	3,566					382	24
Whitefish			1,402	80			53	3
Yellowtail	310,568	11,044	151,701	3,463			22,435	702
Other fish			825	50			309	16
Total	70,606,116	524,833	44,774,814	363,610	105,026	4,796	895,931	62,496
SHELLFISH								
Sea crawfish or spiny lobster							9	2
Octopus					32	4		
Squid	180	18	31,663	1,285			37	4
Total	180	18	31,663	1,285	32	4	46	6
Grand total	70,606,296	524,851	44,806,477	364,895	105,058	4,800	895,977	62,502

Species	Trammel nets		Lines				Paranzella nets	
			Set and hand		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	7	$1	558,826	$28,847	260,317	$11,862		
Dolphin			498	13				
Flounders:								
"California halibut"	381,026	44,281	28,573	3,168	20	2	404,800	$35,180
"Sole"	7,009	376	3,179	179			349,524	12,979
Other	639	33	10,607	2,468			243	17
Grayfish	49,425	1,193	175,913	4,110	98	1	5,033	116
Hake			285	22				
Horse mackerel			3,352	108				
Kingfish			22,226	428				
"Lingcod"			4,445	233				
Mackerel	29	1	1,650,353	18,336	211	2		
Marlin			4,536	186				
Perch			2,538	144			416	34
Rock bass	835	56	220,879	13,649	1,465	81	392	27
Rockfishes	946	43	2,661,549	90,526			1,230	52
Rudderfish			18	1				

Fisheries of the San Pedro division of the southern district of California, 1931—Con.

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Trammel nets		Lines				Paranzella nets	
			Set and hand		Troll			
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sablefish			19,501	$923				
Sculpin	330	$30	73,855	6,832			184	$18
Sea bass:								
Black	2,039	96	99,299	4,702			102	5
White	4,248	562	26,519	2,776	227	$26	1,040	134
Sheepshead	24,939	694	46,917	719	43	1	140	4
Skates	6,556	138	7,647	156			19,414	415
Smelt			2,352	77			65	1
Tuna and tunalike fishes:								
Albacore			427	39	5,866	536		
Bluefin			204	16	120	11		
Bonito	251	5	159,107	2,592	9,296	163		
Skipjack or striped tuna			7,132,238	215,987	31,978	838		
Yellowfin			33,417	2,436	16,104	1,453		
Whitefish	1,505	82	94,262	5,900				
Yellowtail	276	8	223,465	5,597	18,570	512	90	2
Other fish	578	26	9,391	607	1,945	82	390	25
Total	480,638	47,625	13,276,378	411,777	346,260	15,570	783,063	49,009
SHELLFISH								
Sea crawfish or spiny lobster	12,934	2,372	15	3			98	15
Octopus			164	21				
Squid							70	4
Total	12,934	2,372	179	24			168	19
Grand total	493,572	49,997	13,276,557	411,801	346,260	15,570	783,231	49,028

Species	Traps		Harpoons		Shovels		Abalone outfits	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounder: "Sole"	160	$8						
Kingfish	102	2						
Mackerel	10	1						
Marlin			19,566	$864				
Perch	231	14						
Rock bass	96,217	6,323						
Rockfishes	21	1						
Sculpin	1,703	152						
Sheepshead	97,886	3,425						
Swordfish			211,399	28,906				
Whitefish	565	30						
Total	196,895	9,956	230,965	29,770				
SHELLFISH								
Crabs	56	3						
Sea crawfish or spiny lobster	235,337	38,787						
Abalone							35,415	$8,472
Clams:								
Cockle					8,620	$2,033		
Pismo					22,081	8,141		
Octopus	129	15						
Total	235,522	38,805			30,701	10,174	35,415	8,472
Grand total	432,417	48,761	230,965	29,770	30,701	10,174	35,415	8,472

Fisheries of the San Pedro division of the southern district of California, 1931—Con.

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara nets		Gill nets		Lines, set, and hand		Traps	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	607,520	$99,082	3,788	$300	336	$18	40,484	$2,840		
Cabrilla							101,749	4,386		
Corbina							2,084	96		
Flounders, "California halibut"	574	46					1,060	64		
Grayfish	25	1								
Groupers							452	14		
Kingfish			2,633	40						
Mackerel							153	3		
Mullet			4,515	316						
Rock bass	966	66	269	14			21,104	1,356		
Rockfishes							822	31		
Rudderfish	199	14								
Sea bass:										
Black	15,168	684	109	7			99,676	5,008		
White	112,051	7,676	4,681	622	10,374	656	10,461	732		
Smelt			88	2						
Spanish mackerel	3,768	151					15,012	2,336		
Swordfish	365	11								
Tuna and tunalike fishes:										
Bluefin	1,168,263	47,001								
Bonito	56,058	849	726	14	287	6	7,421	135		
Skipjack or striped tuna	244,321	7,970					1,940,968	58,876		
Yellowfin	640,009	34,129					12,352,681	634,368		
Whitefish	585	18					10,085	599		
Yellowtail	117,743	5,477	97,042	2,312			251,770	16,484		
Other fish			160	8			690	26		
SHELLFISH										
Sea crawfish or spiny lobster									1,799	$353
Total	2,967,615	203,175	114,011	3,635	10,997	680	14,856,672	727,354	1,799	353

Fisheries of the San Diego division of the southern district of California, 1931

OPERATING UNITS: BY GEAR

Item	Lampara nets, sardine	Gill nets			Trammel nets	Lines		Traps, lobster	Harpoons, swordfish and turtle	Total, exclusive of duplication
		Drift, barracuda	Set, sea bass	Other		Set and hand	Troll			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	65	6	13		9	789	11	23	40	80
On boats	29	40	40	16	26	160	68	78	36	219
Total	94	46	53	16	35	949	79	101	76	1,023
Vessels, motor	12	2	4		3	100	3	7	9	104
Net tonnage	99	14	24		21	5,607	25	56	83	5,647
Boats:										
Motor	6	18	17	8	11	84	57	53	16	114
Other				2		1		4		6
Apparatus:										
Number	18	20	21	12	14	1,572	370	2,226	25	
Length, yards	4,070									
Square yards		157,310	125,420	9,740	196,668					
Hooks						94,345	370			

Fisheries of the San Diego division of the southern district of California, 1931—Continued

CATCH OFF CALIFORNIA: By GEAR

Species	Purse seines		Lampara nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			240	$5				
Barracuda	4,372	$518			33,000	$1,945		
Flounders:								
"California halibut"					354	43	85,225	$10,554
"Sole"							257	30
Grayfish					77,339	483	46,105	212
Herring					17,593	282		
Kingfish			617	21				
Mackerel					7,140	119		
Mullet					8,815	709		
Perch			290	14	43	2		
Pilchard or sardine			131,156	1,211	1,010	16		
Pompano			326	105				
Rock bass					696	34	1,021	56
Rockfishes					247	12	292	12
Sea bass:								
Black					5,323	203	147	7
White					153,629	10,129	546	68
Sheepshead					130	3	339	10
Skates					484	7	865	14
Smelt			2,426	61	14,365	368		
Tuna and tunalike fishes:								
Bluefin			3,168	228				
Bonito					2,665	40	24	1
Skipjack or striped tuna	42,223	1,266						
Yellowfin					59	4		
Whitefish							17	1
Yellowtail					14,220	311		
Total	46,595	1,784	138,223	1,645	337,112	14,710	134,838	10,965
SHELLFISH								
Sea crawfish or spiny lobster							1,335	217
Grand total	46,595	1,784	138,223	1,645	337,112	14,710	136,173	11,182

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	820,989	$37,451	250,135	$11,411				
Flounders:								
"California halibut"	2,862	305						
"Sole"	1,785	196			16	$2		
Grayfish	56,732	292						
Kingfish	848	17						
Mackerel	206,218	3,717	166	3				
Rock bass	144,169	6,535	521	24	25,904	928		
Rockfishes	886,627	33,482			708	32		
Sculpin	12,281	1,004			119	10		
Sea bass:								
Black	136,732	5,702						
White	55,238	4,064	529	39				
Sheepshead	6,818	176			18,362	592		
Skates	200	13						
Swordfish							145,983	$19,662
Tuna and tunalike fishes:								
Bonito	209,131	2,616	13,302	166				
Skipjack or striped tuna	4,271,142	127,236	35,428	1,063				
Yellowfin	53,833	2,816	2,160	113				
Whitefish	109,195	4,944						
Yellowtail	917,101	20,893	49,315	1,123				
Other fish	333	14	20	1				
Total	7,892,234	251,473	351,576	13,943	45,109	1,564	145,983	19,662
SHELLFISH								
Sea crawfish or spiny lobster					132,883	21,136		
Grand total	7,892,234	251,473	351,576	13,943	177,992	22,700	145,983	19,662

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro division.

Fisheries of the San Diego division of the southern district of California, 1931—Continued

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	10,765	$970			1,605	$123		
Flounders, "California halibut"					166	12	38,461	$3,992
Grayfish					3,345	5		
Mullet			2,305	$231	342	27		
Pompano			738	88				
Sea bass:								
Black					14,647	541	5,716	221
White					101,315	7,394	52	3
Smelt					9	1		
Tuna and tunalike fishes: Bluefin	7,140	321						
Yellowtail	4,484	269			691	25		
Total	22,389	1,560	3,043	319	122,120	8,128	44,229	4,216
SHELLFISH								
Sea crawfish or spiny lobster							95	13
Grand total	22,389	1,560	3,043	319	122,120	8,128	44,324	4,229

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	123,101	$9,869	39,298	$3,150				
Cabrilla	126,088	5,017						
Flounders, "California halibut"	88	9						
Groupers	21,157	790						
Rock bass	13,381	1,081	42	3				
Rockfishes	3,182	127						
Sculpin	115	9						
Sea bass:								
Black	110,310	4,767						
White	101,372	7,401	597	44				
Sheepshead	1,290	39						
Spanish mackerel	4,922	212						
Tai	1,165	58						
Tuna and tunalike fishes:								
Bluefin	371	26						
Bonito	658	20						
Skipjack or striped tuna	2,355,856	76,531						
Yellowfin	23,431,725	1,300,300						
Whitefish	2,759	126						
Yellowtail	343,833	15,557	2,549	115				
Total	26,641,373	1,421,939	42,486	3,312				
SHELLFISH, ETC.								
Sea crawfish or spiny lobster					955,580	$159,759		
Turtles							6,657	$506
Total					955,580	159,759	6,657	506
Grand total	26,641,373	1,421,939	42,486	3,312	955,580	159,759	6,657	506

NOTE.—The catch by purse seines was made entirely by fishermen from the San Pedro division.

LAKE FISHERIES [8]

The yield of the United States fisheries of the Great Lakes, including the international lakes of northern Minnesota, during 1931 amounted to 91,726,845 pounds, valued at $6,029,247. This is a decrease of 3 percent in quantity, and less than one half of 1 percent in the value as compared with the quantity and value in the previous year. These fisheries gave employment to 6,839 fishermen or 2 percent less than in 1930. Of the total number of fishermen, 1,697 regular fishermen were engaged on vessels, and 3,674 regular and 1,468 casual fishermen were employed in the shore and boat fisheries.

Lake fisheries of the United States and Canada, 1931

CATCH: BY LAKES

Species	Lake Ontario			Lake Erie		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike	36,946	37,400	74,346	12,642,872	5,358,300	18,001,172
Bowfin	450	(1)	450	2,765	(1)	2,765
Burbot	56,181	(1)	56,181	270,630	(1)	270,630
Carp	34,932	45,400	80,332	2,340,069	425,300	2,765,369
Catfish and bullheads	42,029	163,500	205,529	508,711	141,800	650,511
Cisco				346,553	949,300	1,295,853
Eels	44,577	74,800	119,377			
Goldfish				79,774	(1)	79,774
Lake herring	50,309	1,117,800	1,168,109			
Lake trout	14,004	388,200	402,204	3,047	7,100	10,147
Mooneye				20,593	(1)	20,593
Pike (jacks)	10,746	173,300	184,046	24,002	63,200	87,202
Rock bass	602	(1)	602	3,451	(1)	3,451
Sauger				2,025,513	(1)	2,025,513
Sheepshead				1,616,889	(1)	1,616,889
Sturgeon	8,275	2,303	10,578	15,234	22,736	37,970
Sucker "mullet"	29,079	(1)	29,079	1,414,842	(1)	1,414,842
Sunfish	13,182	(1)	13,182			
White bass				418,199	(1)	418,199
Whitefish:						
Common	67,485	525,900	593,385	1,272,902	1,106,400	2,379,302
Menominee	111	(1)	111			
Yellow perch	23,848	77,100	100,948	9,057,161	4,265,100	13,322,261
Yellow pike	8,789	25,700	34,489	2,640,556	366,400	3,006,956
Mussel shells				68,446	(1)	68,446
Miscellaneous		266,700	266,700		1,102,000	1,102,000
Total	441,545	2,898,103	3,339,648	34,772,209	13,807,636	48,579,845

[1] Where there has been a Canadian catch of these species it is included under "Miscellaneous."

[8] The statistics of the catch presented herewith were obtained largely from the records of the various State fishery agencies and from the Dominion Bureau of Statistics, Ottawa, Canada. The data for the operating units (fishermen, vessels, boats, and gear) of the United States were obtained largely by Bureau agents in a special canvass; although State records in several instances were very helpful in this work.

In all cases the statistics collected are for the calendar year, except for Lake of the Woods, Rainy Lake, and Lake Namakan in Minnesota, which are for two seasons. For Lake of the Woods the seasons are from June 1 to Nov. 1 and Dec. 1 to Apr. 1 and for Rainy and Namakan Lakes from May 15 to Nov. 1 and Dec. 1 to Apr. 1. The catch for these two seasons, in the order named, have been combined to constitute a year. The quantity of fish taken in these lakes between Jan. 1 and Apr. 1 is estimated at less than 3 percent of the total catch.

Lake fisheries of the United States and Canada, 1931—Continued

CATCH: BY LAKES—Continued

Species	Lake Huron			Lake Michigan	Lake Superior		
	United States	Canada	Total	United States	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bowfin	3,275	(1)	3,275	86			
Buffalofish				500			
Burbot	3,646	(1)	3,646	94,393	2,994	(1)	2,994
Carp	963,709	78,300	1,042,009	831,669	153	2,500	2,653
Catfish and bullheads	107,982	11,000	118,982	46,865	25	(1)	25
Chubs	500,647	987,200	1,487,847	3,401,737	663,868	(1)	663,868
Lake herring	5,201,543	757,200	5,958,743	5,248,738	6,911,624	1,396,100	8,307,724
Lake trout	2,067,940	2,847,800	4,915,740	5,542,698	2,989,643	1,328,400	4,318,043
Mooneye				6,105			
Pike (jacks)	39,536	213,600	253,136	34,450	11,977	8,600	20,577
Rock bass	18,671	(1)	18,671	1,641			
Sauger	170,905	(1)	170,905	26,218	583	(1)	583
Sheepshead	8,641	(1)	8,641	7,862			
Smelt				86,469			
Steelhead trout					539	(1)	539
Sturgeon		17,267	17,267			4,600	4,600
Sucker "mullet"	2,303,990	(1)	2,303,990	2,452,745	168,096	(1)	168,096
Whitefish:							
Common	4,491,458	1,460,100	5,951,558	4,327,387	489,903	256,000	745,903
Menominee	42,785	(1)	42,785	159,666	11,789	(1)	11,789
Yellow perch	822,775	40,600	863,375	1,278,968	4,847	(1)	4,847
Yellow pike	848,452	416,900	1,265,352	51,753	25,084	103,200	128,284
Crawfish				75,130			
Mussel shells	131,210	(1)	131,210	1,383,867			
Miscellaneous		385,000	385,000			69,400	69,400
Total	17,727,165	7,214,967	24,942,132	25,058,947	11,281,125	3,168,800	14,449,925

Species	Namakan Lake			Rainy Lake		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike					3,275	3,275
Chubs	48,749		48,749	9,106	63,657	72,763
Crappie	3,106		3,106			
Pike (jacks)	40,809	4,624	45,433	59,883	112,129	172,012
Sturgeon	772	2,094	2,866	1,061	780	1,841
Sucker "mullet"	8,327		8,327	842	(1)	842
Whitefish: Common	15,629	9,590	25,219	79,768	24,035	103,803
Yellow perch	1,583	(1)	1,583	2,478	6,452	8,930
Yellow pike	49,520	16,589	66,109	89,472	159,417	248,889
Miscellaneous					1,865	1,865
Total	168,495	32,897	201,392	242,610	371,610	614,220

Species	Lake of the Woods			Total, all lakes		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Blue pike		1,914	1,914	12,679,818	5,400,889	18,080,707
Bowfin				6,576	(1)	6,576
Buffalofish				500	(1)	500
Burbot	35,723	(1)	35,723	463,567	(1)	463,567
Carp	9,532	1,866	11,398	4,180,064	553,366	4,733,430
Catfish and bullheads	12,299	39,839	52,138	717,911	356,139	1,074,050
Chubs				4,624,107	1,050,857	5,674,964
Cisco				346,553	949,300	1,295,853
Crappie	136	(1)	136	3,242	(1)	3,242
Eels				44,577	74,800	119,377

[1] Where there has been a Canadian catch of these species it is included under "Miscellaneous."

Lake fisheries of the United States and Canada, 1931—Continued

CATCH: BY LAKES—Continued

Species	Lake of the Woods			Total, all lakes		
	United States	Canada	Total	United States	Canada	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Goldfish				79,774	(1)	79,774
Lake herring				17,412,214	3,271,100	20,683,314
Lake trout	327	13,980	14,307	10,617,659	4,585,480	15,203,139
Mooneye				26,698	(1)	26,698
Pike (jacks)	168,352	387,287	555,639	389,755	962,740	1,352,495
Rock bass				24,365	(1)	24,365
Sauger	218,657	(1)	218,657	2,441,876	(1)	2,441,876
Sheepshead				1,633,392	(1)	1,633,392
Smelt				86,469	(1)	86,469
Steelhead trout				539	(1)	539
Sturgeon	1,135	705	1,840	26,477	50,485	76,962
Sucker "mullet"	126,000	(1)	126,000	6,503,921	(1)	6,503,921
Sunfish				13,182	(1)	13,182
Tullibees	435,225	20,398	455,623	435,225	20,398	455,623
White bass				418,199	(1)	418,199
Whitefish:						
Common	16,662	410,550	427,212	10,761,194	3,792,575	14,553,769
Menominee				214,351	(1)	214,351
Yellow perch	55,883	12,378	68,261	11,247,543	4,401,630	15,649,173
Yellow pike	954,818	642,023	1,596,841	4,668,444	1,730,229	6,398,673
Crawfish				75,130		75,130
Mussel shells				1,583,523		1,583,523
Miscellaneous		80,278	80,278		1,905,243	1,905,243
Total	2,034,749	1,611,218	3,645,967	91,726,845	29,105,231	120,832,076

[1]Where there has been a Canadian catch of these species it is included under "Miscellaneous."

Lake fisheries of the United States, 1931

OPERATING UNITS: BY LAKES

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:							
On vessels	3	329	236	1,012	117		1,697
On boats and shore:							
Regular	94	829	885	770	987	109	3,674
Casual	53	250	61	1,008	96		1,468
Total	150	1,408	1,182	2,790	1,200	109	6,839
Vessels:							
Steam		30	15	58	8		111
Net tonnage		799	247	1,179	168		2,393
Motor	1	33	50	278	32		394
Net tonnage	18	312	546	3,038	278		4,192
Total vessels	1	63	65	336	40		505
Total net tonnage	18	1,111	793	4,217	446		6,585
Boats:							
Motor	43	291	337	524	479	82	1,756
Other	61	404	200	538	253	24	1,480
Apparatus:							
Haul seines	3	179	74	51	9		316
Length, yards	183	80,211	33,734	18,828	1,217		134,173
Gill nets:							
"Bull", 3 to 3 1/16 inches		884					884
Square yards		320,892					320,892
"Shoal", 2 1/4 to 3 3/4 inches	640	10,899	2,018	17,199	6,572		37,328
Square yards	91,950	1,730,010	530,430	3,993,909	1,696,860		8,043,159
"Shoal", 4 to 6 inches	602	5,840	7,043	43,227	8,471	244	65,427
Square yards	79,580	1,475,812	2,246,670	11,750,957	2,711,340	74,930	18,339,289
"Shoal", 6 to 10 inches	164			180			344
Square yards	21,320			34,200			55,520
"Shoal", 10 to 14 inches	10	108					118
Square yards	1,150	22,494					23,644

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: By lakes—Continued

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Trammel nets		211		5			216
Square yards		8,862		140			9,002
Lines:							
Hand			2		50		52
Hooks			4		50		54
Troll			1	15	15		31
Hooks			2	15	31		48
Trot	23	54	117	632	1,349		2,175
Hooks	6,510	11,455	110,400	312,850	411,554		852,769
Pound nets		73	612	781	131	76	1,673
Trap nets	137	3,891	2,497	378	85		6,988
Fyke nets	152	925	377	853	25	105	2,437
Dip nets		1					1
Crawfish pots				3,680			3,680
Spears			1				1
Crowfoot bars		2	3	411			416
Tongs				9			9
Picks		10	8	169			187

OPERATING UNITS: By States and lakes

Item	New York			Pennsylvania, Lake Erie	Ohio, Lake Erie
	Lake Ontario	Lake Erie	Total		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	73	76	157	99
On boats ans shore:					
Regular	94	56	150	34	629
Casual	53	43	96	4	84
Total	150	172	322	195	812
Vessels:					
Steam		5	5	17	8
Net tonnage		122	122	444	233
Motor	1	10	11	12	11
Net tonnage	18	69	87	124	119
Total vessels	1	15	16	29	19
Total net tonnage	18	191	209	568	352
Boats:					
Motor	43	20	63	13	214
Other	61	49	110	16	268
Apparatus:					
Haul seines	3	15	18		95
Length, yards	183	1,633	1,816		59,984
Gill nets:					
"Bull", 3 to 3 1/16 inches		592	592	292	
Square yards		214,896	214,896	105,996	
"Shoal", 2 1/4 to 3 3/4 inches	640	622	1,262	5,026	5,237
Square yards	91,950	110,640	202,590	828,290	788,750
"Shoal", 4 to 6 inches	602	2,284	2,886	3,360	186
Square yards	79,580	642,204	721,784	804,042	27,900
"Shoal", 6 to 10 inches	164		164		
Square yards	21,320		21,320		
"Shoal", 10 to 14 inches	10	108	118		
Square yards	1,150	22,494	23,644		
Trammel nets					211
Square yards					8,862
Lines:					
Trot	23	54	77		
Hooks	6,510	11,455	17,965		
Pound nets				53	20
Trap nets	137	23	160	26	3,722
Fyke nets	152		152		384

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Item	Michigan					Indiana, Lake Michigan
	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Total	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		236	473	76	785	18
On boats and shore:						
Regular	110	885	445	332	1,772	6
Casual	119	61	509	56	745	57
Total	229	1,182	1,427	464	3,302	81
Vessels:						
Steam		15	29	8	52	1
Net tonnage		247	457	168	872	26
Motor		50	121	18	189	5
Net tonnage		546	1,186	136	1,868	76
Total vessels		65	150	26	241	6
Total net tonnage		793	1,643	304	2,740	102
Boats:						
Motor	44	337	315	171	867	57
Other	71	200	368	49	688	1
Apparatus:						
Haul seines	69	74	1	9	153	
Length, yards	18,594	33,734	300	1,217	53,845	
Gill nets:						
"Shoal", 2¼ to 3¾ inches	14	2,018	5,983	2,310	10,325	405
Square yards	2,330	530,430	1,279,340	522,810	2,334,910	99,839
"Shoal", 4 to 6 inches	10	7,043	26,792	5,489	39,334	448
Square yards	1,666	2,246,670	6,718,256	1,758,614	10,725,206	120,756
"Shoal", 6 to 10 inches						180
Square yards						34,200
Lines:						
Hand		2		50	52	
Hooks		4		50	54	
Troll		1	15	15	31	
Hooks		2	15	31	48	
Trot		117	86	781	984	
Hooks		110,400	136,200	296,254	542,854	
Pound nets		612	550	70	1,232	5
Trap nets	120	2,497	362	83	3,062	
Fyke nets	541	377	60	6	984	
Dip nets	1				1	
Spears		1			1	
Crowfoot bars	2	3	341		346	70
Picks	10	8	157		175	

Item	Illinois, Lake Michigan	Wisconsin			Minnesota		
		Lake Michigan	Lake Superior	Total	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	45	476	41	517			
On boats and shore:							
Regular	11	308	126	434	529	109	638
Casual		442	34	476	6		6
Total	56	1,226	201	1,427	535	109	644
Vessels:							
Steam	2	26		26			
Net tonnage	29	667		667			
Motor	11	141	14	155			
Net tonnage	142	1,634	142	1,776			
Total vessels	13	167	14	181			
Total net tonnage	171	2,301	142	2,443			

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Item	Illinois, Lake Michigan	Wisconsin			Minnesota		
		Lake Michigan	Lake Superior	Total	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	4	148	64	212	244	82	326
Other	1	168	52	220	152	24	176
Apparatus:							
Haul seines		50		50			
Length, yards		18,528		18,528			
Gill nets:							
"Shoal", 2¼ to 3¾ inches	1,381	9,430	1,025	10,455	3,237		3,237
Square yards	312,030	2,302,700	255,480	2,558,180	918,570		918,570
"Shoal", 4 to 6 inches	1,366	14,621	1,591	16,212	1,391	244	1,635
Square yards	434,640	4,477,305	532,660	5,009,965	420,066	74,930	494,996
Trammel nets		5		5			
Square yards		140		140			
Lines:							
Trot		546	134	680	434		434
Hooks		176,650	28,550	205,200	86,750		86,750
Pound nets	1	225	61	286		76	76
Trap nets		16	2	18			
Fyke nets		793	19	812		105	105
Crawfish pots		3,680		3,680			
Tongs		9		9			
Picks		12		12			

OPERATING UNITS OF LAKE ONTARIO:[1] BY GEAR

Item	Haul seines	Gill nets				Trot lines	Trap nets	Fyke nets	Total, exclusive of duplication
		"Shoal", 2¼ to 3¾ inches	"Shoal", 4 to 6 inches	"Shoal", 6 to 10 inches	"Shoal", 10 to 14 inches				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		3							3
On boats and shore:									
Regular	6	54	45	4		4	29	18	94
Casual		15	2	3	7	20	8	2	53
Total	6	72	47	7	7	24	37	20	150
Vessels, motor		1							1
Net tonnage		18							18
Boats:									
Motor	2	25	20	4		4	12	6	43
Other	3	15	3		7	19	15	9	61
Apparatus:									
Number	3	640	602	164	10	23	137	152	
Length, yards	183								
Square yards		91,950	79,580	21,320	1,150				
Hooks						6,510			

[1] Includes Niagara River below the Falls and the St. Lawrence River.

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS OF LAKE ERIE:[2] BY GEAR

Item	Haul seines	Gill nets				Trammel nets	Trot lines	Pound nets
		"Bull", 3 to 3 1/16 inches	"Shoal", 2 1/4 to 3 3/4 inches	"Shoal", 4 to 6 inches	"Shoal", 10 to 14 inches			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		107	254	220				
On boats and shore:								
Regular	267		30	27	11	16	14	31
Casual	148		9	2	7	3	35	2
Total	415	107	293	249	18	19	49	33
Vessels:								
Steam		7	25	21				
Net tonnage		215	677	526				
Motor		14	23	21				
Net tonnage		127	228	189				
Total vessels		21	48	42				
Total net tonnage		342	905	715				
Boats:								
Motor	73		11	8	9	8	9	12
Other	142		7	4	1	4	36	13
Apparatus:								
Number	179	884	10,899	5,840	108	211	54	73
Length, yards	80,211							
Square yards		320,892	1,730,010	1,475,812	22,494	8,862		
Hooks							11,455	

Item	Trap nets	Fyke nets	Dip nets	Crowfoot bars	Picks	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							329
On boats and shore:							
Regular	480	123					829
Casual	16	35	1	4	10	6	250
Total	496	158	1	4	10	6	1,408
Vessels:							
Steam							30
Net tonnage							799
Motor							33
Net tonnage							312
Total vessels							63
Total net tonnage							1,111
Boats:							
Motor	174	45					291
Other	163	55	1	2	10	4	404
Apparatus: Number	3,891	925	1	2	10		

[2] Includes Niagara River above the Falls.

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS OF LAKE HURON: BY GEAR

Item	Haul seines	Gill nets		Lines			Pound nets
		"Shoal", 2¼ to 3¾ inches	"Shoal", 4 to 6 inches	Hand	Troll	Trot	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		75	145			72	36
On boats and shore:							
Regular	176	175	234			54	314
Casual		35	45	3	1	1	2
Total	176	285	424	3	1	127	352
Vessels:							
Steam		7	12			7	2
Net tonnage		126	174			148	16
Motor		10	27			6	10
Net tonnage		183	347			122	62
Total vessels		17	39			13	12
Total net tonnage		309	521			270	78
Boats:							
Motor	53	95	129	1		24	104
Other	23	28	32	1	1	6	96
Apparatus:							
Number	74	2,018	7,043	2	1	117	612
Length, yards	33,734						
Square yards		530,430	2,246,670				
Hooks				4	2	110,400	

Item	Trap nets	Fyke nets	Spears	Crowfoot bars	Picks	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	53						236
On boats and shore:							
Regular	523	72					885
Casual		1	1	3	8	4	61
Total	576	73	1	3	8	4	1,182
Vessels:							
Steam							15
Net tonnage							247
Motor	20						50
Net tonnage	162						546
Total vessels	20						65
Total net tonnage	162						793
Boats:							
Motor	177	26		1			337
Other	58	14	1	2	8		200
Apparatus: Number	2,497	377	1	3	8		

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS OF LAKE MICHIGAN: BY GEAR

Item	Haul seines	Gill nets			Trammel nets	Lines		Pound nets
		"Shoal", 2¼ to 3¾ inches	"Shoal", 4 to 6 inches	"Shoal", 6 to 10 inches		Troll	Trot	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	560	914	12			214	73
On boats and shore:								
Regular	104	251	417				23	365
Casual	21	220	424		5	15	29	30
Total	128	1,031	1,755	12	5	15	266	468
Vessels:								
Steam		32	50				19	2
Net tonnage		646	924				481	64
Motor	1	154	250	4			46	25
Net tonnage	6	1,715	2,710	56			543	171
Total vessels	1	186	300	4			65	27
Total net tonnage	6	2,361	3,634	56			1,024	235
Boats:								
Motor	11	150	229			9	25	160
Other	43	66	68		5		12	112
Apparatus:								
Number	51	17,199	43,227	180	5	15	632	781
Length, yards	18,828							
Square yards		3,993,909	11,750,957	34,200	140			
Hooks						15	312,850	

Item	Trap nets	Fyke nets	Crawfish pots	Crowfoot bars	Tongs	Picks	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	37	55						1,012
On boats and shore:								
Regular	118	145	1					770
Casual	1	23	36	230	9	169	67	1,008
Total	156	223	37	230	9	169	67	2,790
Vessels:								
Steam	1							58
Net tonnage	15							1,179
Motor	11	23						278
Net tonnage	110	183						3,038
Total vessels	12	23						336
Total net tonnage	125	183						4,217
Boats:								
Motor	53	59		114			35	524
Other	23	49	37	160	9	112		538
Apparatus: Number	378	853	3,680	411	9	169		

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS OF LAKE SUPERIOR: BY GEAR

Item	Haul seines	Gill nets		Lines			Pound nets	Trap nets	Fyke nets	Total, exclusive of duplication
		"Shoal", 2¼ to 3¾ inches	"Shoal", 4 to 6 inches	Hand	Troll	Trot				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		65	96			65	6	2		117
On boats and shore:										
Regular	16	744	534			306	73	24	16	987
Casual	2	35	40	2	10	26				96
Total	18	844	670	2	10	397	79	26	16	1,200
Vessels:										
Steam		3	8			6				8
Net tonnage		92	168			124				168
Motor		20	24			16	2	1		32
Net tonnage		169	212			115	16	9		278
Total vessels		23	32			22	2	1		40
Total net tonnage		261	380			239	16	9		446
Boats:										
Motor	1	360	279		5	169	33	11	7	479
Other	8	181	51			24	35	10	7	253
Apparatus:										
Number	9	6,572	8,471	50	15	1,349	131	85	25	
Length, yards	1,217									
Square yards		1,696,860	2,711,340							
Hooks				50	31	411,554				

OPERATING UNITS OF LAKE OF THE WOODS, RAINY LAKE, AND NAMAKAN LAKE: BY GEAR

Item	Gill nets "Shoal", 4 to 6 inches	Pound nets	Fyke nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*
On boats and shore: Regular	66	43	35	109
Boats:				
Motor	66	18	28	82
Other		18	8	24
Apparatus:				
Number	244	76	105	
Square yards	74,930			

OPERATING UNITS:[3] BY STATES AND COUNTIES

Item	New York								
	Cayuga	Chautauqua	Erie	Jefferson	Monroe	Niagara	Orleans	Oswego	St. Lawrence
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3	73							
On boats and shore:									
Regular		36	20	41	12	7	8	15	
Casual	1	6	25	16	5	18	2	11	8
Total	4	115	45	57	17	25	10	26	8
Vessels:									
Steam		5							
Net tonnage		122							
Motor	1	10							
Net tonnage	18	69							
Total vessels	1	15							
Total net tonnage	18	191							

[3] Exclusive of operating units used in the mussel fisheries of streams tributary to the Great Lakes.

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	New York								
	Cayuga	Chautauqua	Erie	Jefferson	Monroe	Niagara	Orleans	Oswego	St. Lawrence
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	1	4	16	17	3	4	2	9	
Other		17	20	26	7	19	4	7	7
Apparatus:									
Haul seines		15		3					
Length, yards		1,633		183					
Gill nets:									
"Bull", 3 to 3⅛ inches		592							
Square yards		214,896							
"Shoal", 2½ to 3¾ inches	51	616	6	80	86	67	47	230	
Square yards	8,085	109,440	1,200	11,250	11,610	9,045	6,345	35,050	
"Shoal", 4 to 6 inches		2,284		257	45	18	34	186	
Square yards		642,204		31,975	5,625	2,250	4,250	27,730	
"Shoal", 6 to 10 inches								164	
Square yards								21,320	
"Shoal", 10 to 14 inches			108					10	
Square yards			22,494					1,150	
Lines:									
Trot		11	31	4	1	19	1	2	7
Hooks		2,150	6,655	950	500	4,550	10	500	2,400
Trap nets			23	137					
Fyke nets				147	5				

Item	New York—Continued		Pennsylvania	Ohio					
	Wayne	Total	Erie	Ashtabula	Cuyahoga	Erie	Lake	Lorain	Lucas
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		76	157		22	71		6	
On boats and shore:									
Regular	11	150	34	90	10	221	38	29	52
Casual	4	96	4	8	5	10	2	3	18
Total	15	322	195	98	37	302	40	38	70
Vessels:									
Steam		5	17		3	4		1	
Net tonnage		122	444		128	73		32	
Motor		11	12		1	10			
Net tonnage		87	124		9	110			
Total vessels		16	29		4	14		1	
Total net tonnage		209	568		137	183		32	
Boats:									
Motor	7	63	13	29	5	88	14	13	18
Other	3	110	16	30	6	81	8	16	34
Apparatus:									
Haul seines		18			1	9	1		14
Length, yards		1,816			148	6,434	38		5,033
Gill nets:									
"Bull", 3 to 3⅛ inches		592	292						
Square yards		214,896	105,996						
"Shoal", 2½ to 3¾ inches	79	1,262	5,026		1,240	3,220		609	
Square yards	10,565	202,590	828,290		199,200	473,000		91,350	
"Shoal", 4 to 6 inches	62	2,886	3,360			90		84	
Square yards	7,750	721,784	804,042			13,500		12,600	
"Shoal", 6 to 10 inches		164							
Square yards		21,320							
"Shoal", 10 to 14 inches		118							
Square yards		23,644							
Trammel nets						211			
Square yards						8,862			
Lines:									
Trot	1	77							
Hooks	250	17,965							
Pound nets			53		2				18
Trap nets		160	26	603	87	1,658	258	175	275
Fyke nets		152				44			233

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	Ohio—Continued			Michigan					
	Ottawa	Sandusky	Total	Alcona	Alger	Allegan	Alpena	Antrim	Arenac
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels			99		31	10	38		
On boats and shore:									
Regular	189		629	18	30	14	55	8	73
Casual	24	14	84		12		3	2	
Total	213	14	812	18	73	24	96	10	73
Vessels:									
Steam			8		5	1	4		
Net tonnage			233		76	26	49		
Motor			11		5	2	5		
Net tonnage			119		42	12	81		
Total vessels			19		10	3	9		
Total net tonnage			352		118	38	130		
Boats:									
Motor	47		214	7	19	7	25	3	29
Other	85	8	268	5	5	2	9	2	7
Apparatus:									
Haul seines	64	6	95			1			18
Length, yards	46,159	2,172	59,984			300			8,748
Gill nets:									
"Shoal", 2½ to 3¾ inches	168		5,237		6	35	307	14	48
Square yards	25,200		788,750		1,650	5,810	99,775	3,500	11,536
"Shoal", 4 to 6 inches	12		186		949	360	700	19	147
Square yards	1,800		27,900		354,505	63,000	227,500	4,750	38,970
Trammel nets			211						
Square yards			8,862						
Lines:									
Troll					14				
Hooks					28				
Trot					146	5	14		4
Hooks					73,900	14,000	28,000		2,000
Pound nets			20	15	5	17	28	7	4
Trap nets	661	5	3,722	22		1	223	29	92
Fyke nets	102	5	384	18					60

Item	Michigan—Continued								
	Baraga	Bay	Benzie	Berrien	Charlevoix	Cheboygan	Chippewa	Delta	Emmet
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels			32	27	72	40	17	61	
On boats and shore:									
Regular	18	217		4	13	22	80	161	12
Casual	2		2	6	9	10	20	65	18
Total	20	217	34	37	94	72	117	287	30
Vessels:									
Steam			3	1	3	1	2		
Net tonnage			49	39	39	11	11		
Motor			5	6	19	15	5	22	
Net tonnage			70	67	182	130	44	208	
Total vessels			8	7	22	16	7	22	
Total net tonnage			119	106	221	141	55	208	
Boats:									
Motor	7	66	1	5	9	16	35	74	14
Other	5	38		4	2	1	21	51	3
Apparatus:									
Haul seines		40							
Length, yards		19,416							
Gill nets:									
"Shoal", 2½ to 3¾ inches	107	56	228	176	484	153	190	792	68
Square yards	14,980	14,224	85,300	55,060	121,000	35,430	19,400	108,930	10,761
"Shoal", 4 to 6 inches	35	299	1,266	986	5,065	1,004	1,001	6,025	205
Square yards	5,810	76,174	658,053	323,858	1,266,250	229,448	273,924	1,319,960	25,753
Lines:									
Hand							50		
Hooks							50		
Trot	8	23	2	3	7		89	22	
Hooks	3,800	3,800	4,600	8,400	12,000		39,600	11,000	
Pound nets	8	15		2	25	39	66	150	11
Trap nets		775				411	179	161	13
Fyke nets	6	49						57	

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	Michigan—Continued								
	Gogebic	Grand Traverse	Houghton	Huron	Iosco	Keweenaw	Leelanau	Luce	Mackinac
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels		9	12	27	39	3	54		79
On boats and shore:									
Regular	16	21	88	234	79	103	16	3	129
Casual		16	4	3	4	5	20		11
Total	16	46	104	264	122	111	90	3	219
Vessels:									
Steam		1		4	1		5		1
Net tonnage		9		107	15		83		13
Motor		2	6	2	9	1	14		24
Net tonnage		17	34	15	95	10	85		219
Total vessels		3	6	6	10	1	19		25
Total net tonnage		26	34	122	110	10	168		232
Boats:									
Motor	8	16	39	83	27	56	15	1	59
Other	3	8	10	42	28	6	12	1	45
Apparatus:									
Haul seines	1		7	12					
Length, yards	170		877	4,700					
Gill nets:									
"Shoal", 2½ to 3¾ inches	52	264	956	168	25	716	973		940
Square yards	7,840	46,050	213,550	48,583	7,910	188,870	208,299		194,010
"Shoal", 4 to 6 inches	80	431	1,374	689	1,177	1,717	2,453	6	2,843
Square yards	2,600	126,990	396,860	236,601	491,186	515,100	579,090	1,000	899,225
Lines:									
Troll		3					12		
Hooks		3					12		
Trot	10	2	125	40	17	290	14		6
Hooks	5,000	1,200	62,500	39,600	13,800	55,454	18,800		3,000
Pound nets	2	28	2	243	122	8	27	3	223
Trap nets		38	5	558	81	1	29		150
Fyke nets				148	2				

Item	Michigan—Continued								
	Manistee	Marquette	Mason	Menominee	Monroe	Muskegon	Oceana	Ontonagon	Ottawa
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	16	9	19	14		21	6	11	42
On boats and shore:									
Regular	2	13	8	53	78	23	4	9	24
Casual	7	8		5	61	3	4	6	2
Total	25	30	27	72	139	47	14	26	68
Vessels:									
Steam		1	1			2		2	6
Net tonnage		41	15			18		51	94
Motor	6	1	7	4		6	3	1	4
Net tonnage	50	6	67	67		54	30	6	39
Total vessels	6	2	8	4		8	3	3	10
Total net tonnage	50	47	82	67		72	30	57	133
Boats:									
Motor	3	10	2	23	32	11	2	9	15
Other	4	2	4	16	37	4	2	1	4
Apparatus:									
Haul seines		1			42				
Length, yards		170			12,499				
Gill nets:									
"Shoal", 2½ to 3¾ inches	81	101		400		295	10	142	884
Square yards	15,066	16,160		72,260		52,150	1,500	50,360	201,296
"Shoal", 4 to 6 inches	802	452	808	2,181		1,055	369	265	1,355
Square yards	148,572	208,640	202,000	541,400		180,325	70,830	103,300	291,890
Lines:									
Troll		1							
Hooks		3							
Trot	5	53				9		52	13
Hooks	3,000	26,200				21,600		25,800	31,200
Pound nets	2		11	42		16	2	3	29
Trap nets		2	2	25	120	1			
Fyke nets				3	285				
Dip nets					1				

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	Michigan—Continued								
	Presque Isle	Saginaw	Sanilac	Schoolcraft	St. Clair	Tuscola	Van Buren	Wayne	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	27			33	10	4	22		785
On boats and shore:									
Regular	1	13	23	15	28	26	6	32	1,772
Casual	7		3	3	6	2		40	369
Total	35	13	26	51	44	32	28	72	2,926
Vessels:									
Steam				2	2		4		52
Net tonnage				28	41		57		872
Motor	5			6		2	2		189
Net tonnage	100			110		16	12		1,868
Total vessels	5			8	2	2	6		241
Total net tonnage	100			138	41	16	69		2,740
Boats:									
Motor	4	2	9	7	13	9	3	12	787
Other		5	13	8	7	8		19	444
Apparatus:									
Haul seines		1				3		27	153
Length, yards		165				705		6,095	53,845
Gill nets:									
"Shoal", 2½ to 3¾ inches	421	2	108	239	415	115	340	14	10,325
Square yards	173,310	532	25,435	78,900	53,095	30,600	59,448	2,330	2,334,910
"Shoal", 4 to 6 inches	167	10	120	1,012	644	125	1,128	10	39,334
Square yards	64,990	2,660	31,920	302,600	235,704	37,092	185,010	1,666	10,725,206
Lines:									
Hand					2				52
Hooks					4				54
Troll					1				31
Hooks					2				48
Trot	11		2		8		4		984
Hooks	19,000		2,000		3,200		10,400		542,854
Pound nets			22	45	1	7	2		1,232
Trap nets	23	32		13	14	56	6		3,062
Fyke nets		9			72	19		256	984
Dip nets									1
Spears					1				1
Crowfoot bars									346
Picks									715

Item	Indiana				Illinois			Wisconsin	
	Lake	Laporte	Porter	Total	Cook	Lake	Total	Ashland	Bayfield
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	2	16		18	23	22	45		41
On boats and shore:									
Regular	2	4		6	8	3	11	7	109
Casual	1	9	2	12				8	20
Total	5	29	2	36	31	25	56	15	170
Vessels:									
Steam		1		1	1	1	2		
Net tonnage		26		26	16	13	29		
Motor	1	4		5	7	4	11		14
Net tonnage	12	64		76	78	64	142		142
Total vessels	1	5		6	8	5	13		14
Total net tonnage	12	90		102	94	77	171		142
Boats:									
Motor	2	9	1	12	3	1	4	4	54
Other	1			1		1	1	7	35
Apparatus:									
Gill nets:									
"Shoal", 2½ to 3¾ inches	31	356	18	405	657	724	1,381	2	990
Square yards	3,963	91,916	3,960	99,839	119,430	192,600	312,030	400	247,250
"Shoal", 4 to 6 inches		448		448	498	868	1,366	93	1,449
Square yards		120,756		120,756	122,040	312,600	434,640	12,270	512,060
"Shoal", 6 to 10 inches		180		180					
Square yards		34,200		34,200					
Lines:									
Trot									134
Hooks									28,550
Pound nets	2		3	5		1	1		60
Fyke nets								2	13
Crowfoot bars				70					

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: BY STATES AND COUNTIES—Continued

Item	Wisconsin—Continued									
	Brown	Door	Douglas	Iron	Kenosha	Kewaunee	Manitowoc	Marinette	Milwaukee	Oconto
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	50	135			34	30	37	29	48	40
On boats and shore:										
Regular	91	61	7	3	2	4	23	27		81
Casual	56	162	6		16	32	20	51	21	52
Total	197	358	13	3	52	66	80	107	69	173
Vessels:										
Steam	1				1	1	1		11	
Net tonnage	13				30	19	18		211	
Motor	20	56			10	10	11	12	1	16
Net tonnage	158	566			182	101	203	95	31	137
Total vessels	21	56			11	11	12	12	12	16
Total net tonnage	171	566			212	120	221	95	242	137
Boats:										
Motor	22	44	5	1	6	4	11	13	4	31
Other	49	9	8	2	10	3	16	11	16	24
Apparatus:										
Haul seines	28				1		5	2		13
Length, yards	10,722				400		766	450		6,090
Gill nets:										
"Shoal", 2½ to 3¾ inches	340	2,480	24	9	559	315	1,548	947	1,035	1,500
Square yards	37,400	876,170	6,930	900	202,410	114,090	280,805	137,105	177,210	185,980
"Shoal", 4 to 6 inches	893	5,572	36	13	470	474	857	1,874	1,672	2,063
Square yards	132,535	2,538,600	6,570	1,760	211,140	106,270	144,050	379,656	341,600	282,614
Trammel nets	2						3			
Square yards	100						140			
Lines:										
Trot		168			111	77			4	
Hooks		55,300			36,150	22,900			1,200	
Pound nets	27	62	1				36	16	1	41
Trap nets		12		2		4				
Fyke nets	465	37	4		1	40	13	25	2	208
Crawfish pots	3,680									

Item	Wisconsin—Continued				Minnesota					
	Ozaukee	Racine	Sheboygan	Total	Cook	Lake	Koochiching	St. Louis	Roseau and Lake of the Woods	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	27	20	26	517						
On boats and shore:										
Regular	6		13	434	245	226	26	58	83	638
Casual	2	7	10	463				6		6
Total	35	27	49	1,414	245	226	26	64	83	644
Vessels:										
Steam	2	5	4	26						
Net tonnage	74	126	176	667						
Motor	4		1	155						
Net tonnage	112		49	1,776						
Total vessels	6	5	5	181						
Total net tonnage	186	126	225	2,443						
Boats:										
Motor	3	1	9	212	110	111	19	23	63	326
Other	3	6	8	207	58	70	7	24	17	176

Lake fisheries of the United States, 1931—Continued

OPERATING UNITS: By States and counties—Continued

Item	Wisconsin—Continued				Minnesota					
	Ozaukee	Racine	Sheboygan	Total	Cook	Lake	Koochiching	St. Louis	Roseau and Lake of the Woods	Total
Apparatus:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Haul seines			1	50						
Length, yards			100	18, 528						
Gill nets:										
"Shoal", 2½ to 3¾ inches	537	68	101	10, 455	1, 517	1, 467		253		3, 237
Square yards	240, 170	17, 540	33, 820	2, 558, 180	429, 060	410, 760		78, 750		918, 570
"Shoal", 4 to 6 inches	512	42	192	16, 212	610	550	64	231	180	1, 635
Square yards	244, 600	14, 700	81, 540	5, 009, 965	179, 020	164, 053	14, 930	76, 993	60, 000	494, 996
Trammel nets				5						
Square yards				240						
Lines:										
Trot	15	146	25	680	381	53				434
Hooks	6, 000	46, 800	8, 300	205, 200	80, 050	6, 700				86, 750
Pound nets	2		40	286			16		60	76
Trap nets				18						
Fyke nets			2	812			7		98	105
Crawfish pots				3, 680						
Tongs				9						
Picks				12						

CATCH: By gear

Species	New York							
	Haul seines		Gill nets		Trot lines		Trap nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike			1, 137, 368	$57, 939			2, 904	$182
Bowfin					150	$12		
Burbot			50, 660	992	75	11	130	1
Carp	8, 858	$532	31, 875	1, 528	60	4	4, 571	228
Catfish and bullheads	3, 999	314	644	45	50	5	18, 950	1, 328
Cisco			176, 951	17, 695				
Eels					2, 954	172	33, 539	1, 677
Lake herring			40, 297	3, 224			10, 012	801
Lake trout			11, 687	1, 367			4, 091	491
Pike (jacks)	540	43	785	63	50	4	6, 014	561
Rock bass							641	21
Sturgeon			6, 045	1, 813	15, 692	5, 631	184	55
Sucker "mullet"	15, 956	1, 208	11, 095	296	631	19	17, 654	661
Sunfish							10, 884	327
Whitefish:								
Common			83, 823	22, 135			37, 366	7, 473
Menominee			111	11				
Yellow perch			60, 174	3, 009	16	1	14, 962	748
Yellow pike			1, 273	87			13, 686	1, 162
Total	29, 353	2, 097	1, 612, 788	110, 204	19, 678	5, 859	175, 588	15, 716

Lake fisheries of the United States, 1931—Continued

CATCH: BY GEAR—Continued

Species	New York—Continued				Pennsylvania			
	Fyke nets		Total		Gill nets		Pound nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike			1,140,272	$58,121	3,292,075	$148,143	360,824	$16,237
Bowfin	300	$3	450	15				
Burbot	7,560	151	58,425	1,155			104	1
Carp	1,156	46	46,520	2,338			2,160	130
Catfish and bullheads	19,113	1,338	42,756	3,030	197	20	5,339	334
Cisco			176,951	17,695	127,094	14,743	505	59
Eels	8,084	404	44,577	2,253				
Lake herring			50,309	4,025				
Lake trout			15,778	1,858	1,249	175	8	1
Pike (jacks)	3,357	269	10,746	940				
Rock bass			641	21				
Sheepshead							17,045	935
Sturgeon			21,921	7,499			716	215
Sucker "mullet"	5,845	175	51,181	2,359	21,509	215	4,788	48
Sunfish	2,298	69	13,182	396				
White bass							21,195	1,060
Whitefish:								
Common			121,189	29,608	588,347	98,319	55,590	9,450
Menominee			111	11				
Yellow perch	4,055	230	79,207	3,988	421,271	18,536	53,593	2,358
Yellow pike			14,959	1,249	2,624	325	9,276	1,150
Total	51,768	2,685	1,889,175	136,561	4,454,366	280,476	531,143	31,978

Species	Pennsylvania—Continued				Ohio			
	Trap nets		Total		Haul seines		Gill nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	37,600	$1,892	3,690,499	$166,272	6,884	$275	491,981	$19,679
Bowfin					1,714	17		
Burbot	700	7	804	8	1,598	16	10,230	102
Carp	50	3	2,210	133	1,157,407	28,935	15,366	384
Catfish and bullheads	5,900	590	11,436	944	82,914	4,146	1,606	80
Cisco			127,599	14,802			39,509	5,531
Goldfish					50,784	508		
Lake trout			1,257	176				
Mooneye					8,918	89		
Pike (jacks)					2,274	273		
Sauger					24,195	968	340,007	13,600
Sheepshead	6,325	253	23,370	1,188	525,602	13,140	9,885	247
Sturgeon	150	45	866	260			651	163
Sucker "mullet"	11,400	144	37,697	377	52,442	1,049	34,405	688
White bass	700	35	21,895	1,095	28,352	1,134	891	36
Whitefish, common			643,937	107,769			21,558	3,880
Yellow perch	5,350	235	480,214	21,129	11,860	415	2,659,585	93,085
Yellow pike	4,300	533	16,200	2,008	12,948	1,424	15,011	1,651
Total	72,475	3,707	5,057,984	316,161	1,967,892	52,389	3,640,685	139,126

Lake fisheries of the United States, 1931—Continued

CATCH: BY GEAR—Continued

Species	Ohio—Continued							
	Trammel nets		Pound nets		Trap nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike			13,049	$522	7,336,897	$293,476	236	$9
Bowfin							410	4
Burbot					255,173	2,552		
Carp	112,377	$2,809	11,880	297	107,546	2,689	54,723	1,368
Catfish and bullheads	564	28	8,537	427	189,653	9,483	37,848	1,892
Cisco			25	4	1,819	255		
Goldfish	65	7			2,100	21	4,032	40
Mooneye			5,632	56	4,555	46	1,488	15
Pike (jacks)					4,290	515	1,540	185
Sauger					1,617,896	64,716	16,945	678
Sheepshead	2,363	59	249	6	928,802	23,220	78,560	1,964
Sturgeon					71	18		
Sucker "mullet"	195	4	30,294	605	931,597	18,632	134,587	2,692
White bass			2,588	104	326,635	13,065	37,838	1,514
Whitefish, common			1,147	206	546,844	98,432	2,701	486
Yellow perch			2,121	74	5,732,537	200,639	49,033	1,716
Yellow pike			4,682	515	2,457,235	270,296	50,738	5,581
Total	115,564	2,907	80,204	2,816	20,443,650	998,055	470,679	18,144

Species	Ohio—Continued		Michigan					
	Total		Haul seines		Gill nets		Lines—Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	7,849,047	$313,961						
Bowfin	2,124	21	915	$10				
Burbot	267,001	2,670	95	2	8,074	$162		
Carp	1,459,299	36,482	1,486,517	44,599	1,100	33		
Catfish and bullheads	321,122	16,056	43,908	4,644	72	5		
Chubs			1,579	111	973,708	68,159		
Cisco	41,353	5,790						
Goldfish	56,981	576	8,458	592				
Lake herring			64,622	2,262	1,048,600	36,701		
Lake trout			1,775	231	4,673,170	607,510	183	$24
Mooneye	20,593	206						
Pike (jacks)	8,104	973	5,205	468	7,860	707	71	6
Rock bass			1,511	68	181	9		
Sauger	1,999,043	79,962	1,408	98	122,490	8,574		
Sheepshead	1,545,461	38,636	21,214	636	98	3		
Smelt					400	60		
Sturgeon	722	181						
Sucker "mullet"	1,183,520	23,670	222,256	7,779	298,519	10,448		
White bass	396,304	15,853						
Whitefish:								
Common	572,250	103,004			2,671,082	398,672		
Menominee					165,443	10,754		
Yellow perch	8,455,136	295,929	30,549	2,289	213,965	16,048	2,198	165
Yellow pike	2,540,614	279,467	28,204	4,936	60,728	10,627	76	13
Total	26,718,674	1,213,437	1,918,216	68,725	10,245,490	1,168,472	2,528	208

Lake fisheries of the United States, 1931—Continued

CATCH: BY GEAR—Continued

Species	Michigan—Continued							
	Lines—Continued				Pound nets		Trap nets	
	Troll		Trot					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					634	$7	1,467	$15
Burbot			4,673	$94	1,551	31	2,080	42
Carp			215	6	23,924	718	166,479	4,994
Catfish and bullheads			697	52	2,568	189	110,860	8,028
Chubs			5,858	410	1,644	115	12,043	843
Cisco							650	23
Goldfish							8,134	569
Lake herring					5,368,376	187,894	190,931	6,682
Lake trout	38,304	$4,980	1,375,706	178,842	269,560	35,043	227,837	29,619
Pike (jacks)			122	11	6,632	597	39,114	3,520
Rock bass					2,774	125	10,346	466
Sauger					8,408	588	65,796	4,606
Sheepshead					8,054	242	16,257	488
Sucker "mullet"			1,653	58	591,442	20,701	2,055,090	71,928
Whitefish:								
Common			5,830	874	3,379,909	506,986	2,320,543	348,082
Menominee			123	8	8,407	547	1,882	122
Yellow perch			5,344	401	63,396	4,754	628,598	47,032
Yellow pike	626	110	754	132	322,837	56,496	471,473	81,129
Total	38,930	5,090	1,400,975	180,888	10,060,116	815,033	6,329,580	608,188

Species	Michigan—Continued							
	Fyke nets		Dip nets		Spears		Crowfoot bars	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	986	$10						
Burbot	2,037	40						
Carp	163,931	4,918	248	$7				
Catfish and bullheads	128,393	9,122						
Chubs	1,087	76						
Goldfish	6,201	434						
Lake herring	49,999	1,749						
Lake trout	1,526	198						
Pike (jacks)	21,010	1,892	42	4				
Rock bass	8,912	400						
Sauger	26,074	1,826						
Sheepshead	18,058	542						
Sucker "mullet"	310,960	10,383						
Whitefish:								
Common	19,203	2,882						
Menominee	253	16			82	$5		
Yellow perch	119,424	8,753						
Yellow pike	94,122	16,001						
Mussel shells							978,349	$20,443
Pearls and slugs								1,830
Total	972,176	59,742	290	11	82	5	978,349	22,273

Lake fisheries of the United States, 1931—Continued

CATCH: BY GEAR—Continued

Species	Michigan—Continued						Indiana—Gill nets	
	Picks		By hand		Total			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					4,002	$42		
Burbot					18,510	371	14,692	$697
Carp					1,842,414	55,275	302	15
Catfish and bullheads					286,498	22,040		
Chubs					995,919	69,714	210,984	18,145
Cisco					650	23		
Goldfish					22,793	1,595		
Lake herring					6,722,528	235,288	201,296	7,524
Lake trout					6,588,061	856,447	106,212	14,775
Pike (jacks)					80,056	7,205		
Rock bass					23,724	1,068		
Sauger					224,176	15,692		
Sheepshead					63,681	1,911		
Smelt					400	60		
Sucker "mullet"					3,479,920	121,797	6,256	248
Whitefish:								
Common					8,396,567	1,257,496	2,875	622
Menominee					176,190	11,452		
Yellow perch					1,063,474	79,442	24,398	1,801
Yellow pike					978,820	109,444	170	23
Mussel shells	275,393	$5,797	91,297	$1,809	1,345,039	28,049		
Pearls and slugs		842		375		3,047		
Total	275,393	6,639	91,297	2,184	32,313,422	2,937,458	567,185	43,850

Species	Indiana—Continued							
	Pound nets		Crowfoot bars		By hand		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	500	$30					500	$30
Burbot	75	2					14,767	699
Carp	1,700	48					2,002	63
Chubs							210,984	18,145
Lake herring	45,269	1,358					246,565	8,882
Lake trout	275	36					106,487	14,811
Sucker "mullet"	1,073	44					7,329	292
Whitefish, common	2,400	308					5,275	930
Yellow perch	1,642	157					26,040	1,958
Yellow pike							170	23
Mussel shells			164,000	$2,870	15,000	$315	179,000	3,185
Pearls and slugs				164		40		204
Total	52,934	1,983	164,000	3,034	15,000	355	799,119	49,222

Species	Illinois						Wisconsin—Haul seines	
	Gill nets		Pound nets		Total			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	3,350	$34			3,350	$34		
Carp							765,469	$22,964
Catfish and bullheads							2,130	170
Chubs	403,630	32,290			403,630	32,290		
Lake herring	71,000	1,420	6,000	$120	77,000	1,540	249	5
Lake trout	201,523	20,153			201,523	20,153		
Pike (jacks)							306	28
Sucker "mullet"							12,969	389
Whitefish, common	480	72	4,000	600	4,480	672	30	5
Yellow perch	25,000	2,500	2,000	200	27,000	2,700		
Yellow pike							86	13
Total	704,983	56,469	12,000	920	716,983	57,389	781,239	23,574

Lake fisheries of the United States, 1931—Continued

CATCH: BY GEAR—Continued

Species	Wisconsin—Continued							
	Gill nets		Trammel nets		Trot lines		Pound nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	31,310	$313			25,205	$252	1,541	$15
Carp	8,805	264	3,521	$106			380	11
Catfish and bullheads	704	56					14	1
Chubs	2,937,740	198,642					9,277	649
Lake herring	1,694,105	40,254					3,211,864	64,479
Lake trout	2,152,563	283,530			793,055	103,990	215,850	28,407
Mooneye	6,105	61						
Pike (jacks)	13,812	1,148			76	7	1,554	131
Sheepshead	153	4						
Smelt	84,469	4,243						
Steelhead trout							539	81
Sucker "mullet"	829,971	24,899	892	26			141,235	4,237
Whitefish:								
Common	372,844	55,926					380,414	57,063
Menominee	24,948	1,797					8,337	595
Yellow perch	150,022	10,500			1,539	108	15,070	1,055
Yellow pike	5,462	894					10,046	1,507
Total	8,313,013	622,531	4,413	132	819,875	104,357	3,996,121	158,231

Species	Wisconsin—Continued							
	Trap nets		Fyke nets		Crawfish pots		Tongs	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	382	$4	6,549	$65				
Carp			39,912	1,197				
Catfish and bullheads			40,952	3,276				
Chubs	1,105	77	7,237	506				
Lake herring	405	12	46,539	937				
Lake trout	4,826	629	1,647	227				
Pike (jacks)			6,057	531				
Sheepshead			727	22				
Smelt			1,600	80				
Sucker "mullet"	60	2	623,978	18,720				
Whitefish:								
Common	138,393	20,759	1,905	285				
Menominee	89	6	10	1				
Yellow perch			889,897	62,293				
Yellow pike	128	19	8,149	1,222				
Crawfish					75,130	$4,508		
Mussel shells							24,622	$269
Pearls and slugs								43
Total	145,388	21,508	1,675,159	89,362	75,130	4,508	24,622	312

Species	Wisconsin—Continued				Minnesota			
	Picks		Total		Gill nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot			64,987	$649	17,861	$134		
Carp			818,087	24,542				
Catfish and bullheads			43,800	3,503				
Chubs			2,955,359	199,874	40,858	1,007		
Crappie					1,653	400		
Lake herring			4,953,162	105,687	5,362,650	73,960		
Lake trout			3,167,941	416,783	505,849	51,276	30,736	$3,393
Mooneye			6,105	61				
Pike (jacks)			21,805	1,845	154,660	5,262		
Sauger					109,329	5,466		
Sheepshead			880	26				
Smelt			86,069	4,323				
Steelhead trout			539	81				
Sucker "mullet"			1,609,105	48,273	30,000	300		
Tullibees					217,637	2,176		
Whitefish:								
Common			893,586	134,038	78,629	8,033		
Menominee			33,384	2,399	4,666	280		
Yellow perch			1,056,528	73,956	29,676	2,408		
Yellow pike			23,871	3,655	574,703	60,578		
Crawfish			75,130	4,508				
Mussel shells	34,862	$450	59,484	719				
Pearls and slugs		61		104				
Total	34,862	511	15,869,822	1,025,026	7,128,171	211,280	30,736	3,393

Lake fisheries of the United States, 1931—Continued

CATCH: BY GEAR—Continued

Species	Minnesota—Continued					
	Pound nets		Fyke nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	8,931	$67	8,931	$67	35,723	$268
Carp	5,000	150	4,532	136	9,532	286
Catfish and bullheads			12,299	984	12,299	984
Chubs	12,027	294	5,330	132	58,215	1,433
Crappie	1,589	392			3,242	792
Lake herring					5,362,650	73,960
Lake trout	27	3			536,612	54,672
Pike (jacks)	65,221	2,304	49,163	1,881	269,044	9,447
Sauger	54,670	2,734	54,658	2,733	218,657	10,933
Sturgeon	2,833	863	135	47	2,968	910
Sucker "mullet"	68,005	730	37,164	413	135,169	1,443
Tullibees	108,869	1,089	108,719	1,087	435,225	4,352
Whitefish:						
Common	33,068	3,460	12,213	1,331	123,910	12,824
Menominee					4,666	280
Yellow perch	15,393	1,252	14,875	1,200	59,944	4,860
Yellow pike	270,977	28,964	248,130	27,007	1,093,810	116,549
Total	646,610	42,302	556,149	37,018	8,361,666	293,993

CATCH: BY LAKES

Species	Lake Ontario		Lake Erie			
	New York		New York		Pennsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	36,946	$2,955	1,103,326	$55,166	3,690,499	$166,272
Bowfin	450	15				
Burbot	56,181	1,123	2,244	32	804	8
Carp	34,932	1,572	11,588	766	2,210	133
Catfish and bullheads	42,029	2,944	727	86	11,436	944
Cisco			176,951	17,695	127,599	14,802
Eels	44,577	2,253				
Lake herring	50,309	4,025				
Lake trout	14,004	1,681	1,774	177	1,257	176
Pike (jacks)	10,746	940				
Rock bass	602	18	39	3		
Sheepshead					23,370	1,188
Sturgeon	8,275	2,767	13,646	4,732	866	260
Sucker "mullet"	29,079	1,028	22,102	1,331	37,697	377
Sunfish	13,182	396				
White bass					21,895	1,095
Whitefish:						
Common	67,485	13,497	53,704	16,111	643,937	107,769
Menominee	111	11				
Yellow perch	23,848	1,220	55,359	2,768	480,214	21,129
Yellow pike	8,789	879	6,170	370	16,200	2,008
Total	441,545	37,324	1,447,630	99,237	5,057,984	316,161

Lake fisheries of the United States, 1931—Continued

CATCH: BY LAKES—Continued

Species	Lake Erie—Continued					
	Ohio		Michigan		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	7,849,047	$313,961			12,642,872	$535,399
Bowfin	2,124	21	641	$7	2,765	28
Burbot	267,001	2,670	581	12	270,630	2,722
Carp	1,459,299	36,482	866,972	26,012	2,340,069	63,393
Catfish and bullheads	321,122	16,056	175,426	12,375	508,711	29,461
Chubs					22,793	1,595
Cisco	41,353	5,790	650	23	346,553	38,310
Goldfish	56,981	576	22,793	1,595	79,774	2,171
Lake trout			16	2	3,047	355
Mooneye	20,593	206			20,593	206
Pike (jacks)	8,104	973	15,898	1,431	24,002	2,404
Rock bass			3,412	154	3,451	157
Sauger	1,999,043	79,962	26,470	1,853	2,025,513	81,815
Sheepshead	1,545,461	38,636	48,058	1,442	1,616,889	41,266
Sturgeon	722	181			15,234	5,173
Sucker "mullet"	1,183,520	23,670	171,523	6,003	1,414,842	31,381
White bass	396,304	15,853			418,199	16,948
Whitefish, common	572,250	103,004	3,011	452	1,272,902	227,336
Yellow perch	8,455,136	295,929	66,452	4,668	9,057,161	324,494
Yellow pike	2,540,614	279,467	77,572	11,726	2,640,556	293,571
Mussel shell [4]			68,446	1,333	68,446	1,333
Pearls and slugs [4]				943		943
Total	26,718,674	1,213,437	1,547,921	70,031	34,772,209	1,698,866

Species	Lake Huron, Michigan		Lake Michigan			
			Michigan		Indiana	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	3,275	$33	86	$2		
Buffalofish					500	$30
Burbot	3,646	73	12,722	255	14,767	699
Carp	963,709	28,911	11,580	347	2,002	63
Catfish and bullheads	107,982	9,449	3,090	216		
Chubs	500,647	35,045	431,560	30,209	210,984	18,145
Lake herring	5,201,543	182,054	634,490	22,207	246,565	8,882
Lake trout	2,067,940	268,832	2,561,929	333,050	106,487	14,811
Pike (jacks)	39,536	3,558	24,353	2,192		
Rock bass	18,671	840	1,641	74		
Sauger	170,905	11,963	26,218	1,835		
Sheepshead	8,641	259	6,982	210		
Smelt			400	60		
Sucker "mullet"	2,303,990	80,640	913,023	31,956	7,329	292
Whitefish:						
Common	4,491,458	673,719	3,476,093	519,424	5,275	930
Menominee	42,785	2,781	132,492	8,612		
Yellow perch	822,775	61,706	169,707	12,728	26,040	1,958
Yellow pike	848,452	148,479	46,896	8,207	170	23
Mussel shells [4]	131,210	1,453	1,145,383	25,263	179,000	3,185
Pearls and slugs [4]		372		1,732		204
Total	17,727,165	1,510,167	9,598,645	998,579	799,119	49,222

For footnote see p. 373.

Lake fisheries of the United States, 1931—Continued

CATCH: BY LAKES—Continued

Species	Lake Michigan—Continued					
	Illinois		Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					86	$2
Buffalofish					500	30
Burbot	3,350	$34	63,554	$634	94,393	1,622
Carp			818,087	24,542	831,669	24,952
Catfish and bullheads			43,775	3,502	46,865	3,718
Chubs	403,630	32,290	2,355,563	164,889	3,401,737	245,533
Lake herring	77,000	1,540	4,290,683	85,813	5,248,738	118,442
Lake trout	201,523	20,153	2,672,759	347,458	5,542,698	715,472
Mooneye			6,105	61	6,105	61
Pike (jacks)			10,097	908	34,450	3,100
Rock bass					1,641	74
Sauger					26,218	1,835
Sheepshead			880	26	7,862	236
Smelt			86,069	4,323	86,469	4,383
Sucker "mullet"			1,532,393	45,971	2,452,745	78,219
Whitefish:						
Common	4,480	672	841,539	126,231	4,327,387	647,257
Menominee			27,174	1,902	159,666	10,514
Yellow perch	27,000	2,700	1,056,221	73,936	1,278,968	91,322
Yellow pike			4,687	778	51,753	9,008
Crawfish			75,130	4,508	75,130	4,508
Mussel shells [1]			59,484	719	1,383,867	29,167
Pearls and slugs [1]				104		2,040
Total	716,983	57,389	13,944,200	886,305	25,058,947	1,991,495

Species	Lake Superior					
	Michigan		Wisconsin		Minnesota	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Burbot	1,561	$31	1,433	$15		
Carp	153	5				
Catfish and bullheads			25	1		
Chubs	63,712	4,460	599,796	34,985	360	$14
Lake herring	886,495	31,027	662,479	19,874	5,362,650	73,960
Lake trout	1,958,176	254,563	495,182	69,325	536,285	54,639
Pike (jacks)	269	24	11,708	937		
Sauger	583	41				
Steelhead trout			539	81		
Sucker "mullet"	91,384	3,198	76,712	2,302		
Whitefish:						
Common	426,005	63,901	52,047	7,807	11,851	1,519
Menominee	913	59	6,210	497	4,666	280
Yellow perch	4,540	340	307	20		
Yellow pike	5,900	1,032	19,184	2,877		
Total	3,439,691	358,681	1,925,622	138,721	5,915,812	130,412

For footnote see p. 373.

Lake fisheries of the United States, 1931—Continued

CATCH: BY LAKES—Continued

Species	Lake Superior—Total		Lake of the Woods, Rainy Lake, and Namakan Lake		Total, all lakes	
			Minnesota			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					12,679,818	$538,354
Bowfin					6,576	78
Buffalofish					500	30
Burbot	2,994	$46	35,723	$268	463,567	5,854
Carp	153	5	9,532	286	4,180,064	119,119
Catfish and bullheads	25	1	12,299	984	717,911	46,557
Chubs	663,868	39,459	57,855	1,419	4,624,107	321,456
Cisco					346,553	38,310
Crappie			3,242	792	3,242	792
Eels					44,577	2,253
Goldfish					79,774	2,171
Lake herring	6,911,624	124,861			17,412,214	429,382
Lake trout	2,989,643	378,527	327	33	10,617,659	1,364,900
Mooneye					26,698	267
Pike (jacks)	11,977	961	269,044	9,447	389,755	20,410
Rock bass					24,365	1,089
Sauger	583	41	218,657	10,933	2,441,876	106,587
Sheepshead					1,633,392	41,761
Smelt					86,469	4,383
Steelhead trout	539	81			539	81
Sturgeon			2,968	910	26,477	8,850
Sucker "mullet"	168,096	5,500	135,169	1,443	6,503,921	198,211
Sunfish					13,182	396
Tullibee			435,225	4,352	435,225	4,352
White bass					418,199	16,948
Whitefish:						
Common	489,903	73,227	112,059	11,305	10,761,194	1,646,341
Menominee	11,789	836			214,351	14,142
Yellow perch	4,847	360	59,944	4,860	11,247,543	483,962
Yellow pike	25,084	3,909	1,093,810	116,549	4,668,444	572,395
Crawfish					75,130	4,508
Mussel shells [4]					1,583,523	31,953
Pearls and slugs [4]						3,355
Total	11,281,125	627,814	2,445,854	163,581	91,726,845	6,029,247

[4] From streams tributary to Lakes Michigan, Huron, and Erie.

Industries related to the fisheries of the Lake States, 1931

OPERATING UNITS, SALARIES, AND WAGES

Item	New York	Pennsylvania	Ohio	Michigan
Transporting:	*Number*	*Number*	*Number*	*Number*
Persons engaged			15	4
Vessels:				
Motor			8	1
Net tonnage			88	32
Wholesale and manufacturing:				
Establishments	16	8	41	57
Persons engaged:				
Proprietors	15	14	58	67
Salaried employees	22	7	63	54
Wage earners:				
Average for season	69	58	249	438
Average for year	54	53	215	193
Paid to salaried employees	$36,516	$24,225	$201,954	$157,875
Paid to wage earners	58,062	59,860	261,908	183,872
Total salaries and wages	94,578	84,085	463,862	341,747
Fishermen manufacturing	2	2		37

Industries related to the fisheries of the Lake States, 1931—Continued

OPERATING UNITS, SALARIES, AND WAGES—Continued

Item	Indiana	Illinois	Wisconsin	Minnesota	Total
	Number	*Number*	*Number*	*Number*	*Number*
Transporting:					
Persons engaged					19
Vessel:					
Motor					9
Net tonnage					120
Wholesale and manufacturing:					
Establishments	3	55	35	15	230
Persons engaged:					
Proprietors	3	26	33	9	225
Salaried employees	1	249	48	27	471
Wage earners:					
Average for season	4	352	275	61	1,506
Average for year	4	318	150	47	1,034
Paid to salaried employees	$5,500	$765,402	$109,407	$49,010	$1,349,889
Paid to wage earners	5,500	479,437	167,271	44,640	1,260,550
Total salaries and wages	11,000	1,244,839	276,678	93,650	2,610,439
Fishermen manufacturing	3	12	50		106

PRODUCTS MANUFACTURED

Item	New York		Pennsylvania		Ohio		Michigan	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Blue pike:								
Fresh fillets—pounds	132,900	$28,462	423,747	$81,495	638,082	$123,138		
Frozen fillets—do	39,500	8,075	225,646	43,594	181,240	35,975		
Chubs, smoked—do	(1)	(1)			(1)	(1)	269,800	$67,591
Eels, smoked—do	(1)	(1)						
Lake herring:								
Salted—do							2,052,300	52,433
Smoked—do	(1)	(1)			(1)	(1)	(1)	(1)
Lake trout, smoked—do					(1)	(1)	21,245	4,570
Salmon, smoked—do	(1)	(1)			115,000	24,200		
Sturgeon, smoked—do	(1)	(1)			12,150	8,135		
Tullibee, smoked—do	(1)	(1)			142,500	28,230		
Whitefish, smoked—do	(1)	(1)			44,500	9,780	18,579	4,255
Yellow perch:								
Fresh fillets—do	(1)	(1)	18,454	3,587	666,718	126,444		
Frozen fillets—do			19,155	3,884	141,517	26,883		
Mussel-shell button blanks—gross							220,488	40,011
Unclassified products:								
Fillets, fresh and frozen—pounds	(3)	(3)			[4] 22,190	[4] 4,955	[5] 98,000	[5] 11,520
Smoked—do	(3)	(3)			[7] 90,000	[7] 24,440	(3)	(3)
Miscellaneous	[9] 299,951	[9] 70,890					[10] 25,085	[10] 4,692
Total	472,351	107,427	687,002	132,560	2,053,897	412,180		185,072
By fishermen:								
Chubs, smoked—pounds							17,700	5,040
Lake herring:								
Salted—do							249,600	6,911
Smoked—do							6,250	1,222
Lake trout, smoked—do							550	153
Sturgeon roe, salted—do	45	52	50	50				
Whitefish:								
Common, smoked—do							5,300	1,240
Menominee, smoked—do							200	50
Total	45	52	50	50			279,600	14,616
Grand total	472,396	107,479	687,052	132,610	2,053,897	412,180		199,688

See footnotes on facing page.

Industries related to the fisheries of the Lake States, 1931—Continued

PRODUCTS MANUFACTURED—Continued

Item	Indiana		Illinois		Wisconsin		Minnesota	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Blue pike: Fresh fillets pounds					(1)	(1)		
Chubs, smoked do	(2)	(2)	[2] 905,476	[2] $218,931	665,562	$119,346	(1)	(1)
Eels, smoked do			17,804	4,483				
Lake herring:								
Salted do					923,350	17,906		
Smoked do			(1)	(1)	456,832	22,529	(1)	(1)
Lake trout, smoked do	(2)	(2)	[2] 13,803	[2] 3,534	160,290	28,847	(1)	(1)
Salmon, smoked do			636,965	161,866	37,360	6,364	(1)	(1)
Sturgeon, smoked do			(1)	(1)				
Tullibee, smoked do			325,536	65,165	(1)	(1)	(1)	(1)
Whitefish, smoked do			(1)	(1)	100,267	19,840	(1)	(1)
Yellow perch: Fresh fillets pounds			(1)	(1)	341,200	46,790		
Unclassified products:								
Fillets, fresh and frozen pounds			(3)	(3)	[6] 46,900	[6] 9,080	(3)	(3)
Smoked do			[5] 13,986	[5] 4,240	(3)	(3)	(3)	(3)
Miscellaneous			[11] 2,706,000	[11] 46,200	(12)	[13]12,793	[14]174,250	[14]$34,064
Total	(2)	(2)	[2] 4,619,570	[2] 504,419		283,495	174,250	34,064
By fishermen:								
Chubs, smoked pounds	42,200	$10,550	53,000	10,600				
Lake herring, salted do					1,027,000	25,675		
Lake trout, smoked do	8,450	2,113						
Whitefish: Common, smoked pounds	750	188						
Total	51,400	12,851	53,000	10,600	1,027,000	25,675		
Grand total	[2] 51,400	[2] 12,851	[2] 4,672,570	[2] 515,019		309,170	174,250	34,064

[1] The production of this item is included under unclassified products.
[2] A small amount of smoked chubs and lake trout produced in Indiana is included with Illinois.
[3] The production of this item is included under miscellaneous.
[4] Includes fresh and frozen sauger fillets, fresh whitefish fillets, and frozen yellow pike fillets.
[5] Includes fresh fillets of lake herring, lake trout, whitefish, and yellow pike.
[6] Includes fresh fillets of blue pike, lake trout, sauger, and yellow pike.
[7] Includes smoked carp, chubs, lake herring, lake trout, sablefish, and spoonbill catfish.
[8] Includes smoked buffalofish, butterfish, carp, flounders, lake herring, mackerel, sablefish, shad, sturgeon, and whitefish.
[9] Includes fresh fillets of yellow perch; and smoked chub, cisco, eels, lake herring, salmon, sturgeon, tullibee, and whitefish.
[10] Includes smoked buffalofish, butterfish, carp, lake herring, sablefish, salmon, and menominee; and pickled sea herring.
[11] Includes pickled sea herring and fresh fillets of yellow perch and yellow pike.
[12] Data not available.
[13] Includes smoked tullibees, canned whitefish caviar, spiced alewives, pickled sea herring, and mussel-shell products.
[14] Includes smoked chubs, lake herring, lake trout, salmon, suckers, tullibees, and whitefish; salted lake trout; and fresh fillets of lake herring.

NOTE.—The total value of the products manufactured in the Lake States was as follows: By manufacturing establishments, $1,659,217; and by fishermen, $63,844. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting craft none has been included as fishermen, and among the total persons engaged in the preparation of fishermen's manufactured products, 103 have also been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

FISHERIES OF THE MISSISSIPPI RIVER AND TRIBUTARIES[9]

The yield of fishery products of the Mississippi River and tributaries during 1931 amounted to 82,382,523 pounds, valued at $2,897,357. This is a decrease of 22 percent in the catch and 36 percent in value as compared with the catch and its value in 1922, when the latest preceding canvass was made. Of the total catch in 1931, 44,061,714 pounds, valued at $2,257,204, were fish and 38,320,809 pounds, valued at $640,153, were shellfish and miscellaneous products. The fisheries of this section gave employment to 15,884 fishermen, or 29 percent more than in 1922. All of these fishermen were engaged in the boat and shore fisheries, 5,153 regular, and 10,731 casual.

Fisheries of the Mississippi River and tributaries, 1931

SUMMARY OF CATCH

Products	Alabama		Arkansas		Illinois		Indiana	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	187,153	$20,178	4,859,717	$285,094	6,818,525	$271,623	387,960	$32,632
Shellfish, etc.	1,635,000	12,576	10,872,790	126,357	7,444,105	95,615	7,329,636	124,590
Total	1,822,153	32,754	15,732,507	411,451	14,262,630	367,238	7,717,596	157,222

Products	Iowa		Kansas		Kentucky		Louisiana	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	3,373,648	$214,785	142,859	$13,324	508,719	$51,244	18,163,253	$858,394
Shellfish, etc.	4,404,319	87,610	312,562	3,349	1,113,032	9,638	1,050,115	135,980
Total	7,777,967	302,395	455,421	16,673	1,621,751	60,882	19,213,368	994,374

Products	Minnesota		Mississippi		Missouri		Nebraska	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	2,715,650	$128,498	2,639,623	$121,458	833,636	$75,670	145,310	$16,253
Shellfish, etc.	782,630	9,158	10,100	1,503	94,000	1,311		
Total	3,498,280	137,656	2,649,723	122,961	927,636	76,981	145,310	16,253

Products	Ohio		Oklahoma		South Dakota		Tennessee	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	31,481	$3,759	39,640	$4,145	114,361	$10,576	1,275,749	$86,275
Shellfish, etc.	154,000	3,313					2,159,320	17,640
Total	185,481	7,072	39,640	4,145	114,361	10,576	3,435,069	103,915

Product	Texas		Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	138,500	$6,368	1,685,930	$56,928	44,061,714	$2,257,204
Shellfish, etc.			959,200	11,513	38,320,809	640,153
Total	138,500	6,368	2,645,130	68,441	82,382,523	2,897,357

[9] It should be noted that the statistics for the various States of the Mississippi River and tributaries include tables on the operating units and catch by waters. Where waters are inset in the stub under other waters, it indicates that they are tributary to such waters; also in those cases where one or more waters follow another, separated by colons, such waters are tributary to the water immediately preceding.

Fisheries of the Mississippi River and tributaries, 1931—Continued

OPERATING UNITS: By States

Item	Alabama	Arkansas	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Minnesota
Fishermen:									
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	104	1,463	708	20	245	35	89	1,402	160
Casual	131	1,524	1,318	1,735	648	88	440	3,108	578
Total	235	2,987	2,026	1,755	893	123	529	4,510	738
Boats:									
Motor	32	907	676	544	309	18	92	1,225	65
Other	190	2,359	957	1,189	457	123	420	2,369	446
Apparatus:									
Haul seines		16	127	50	133		24	377	113
Length, yards		7,308	33,975	5,170	36,339		2,057	85,166	49,968
Anchor gill nets		4						74	9
Square yards		2,800						17,400	9,999
Trammel nets		31	28	3		90		78	
Square yards		3,899	4,890	360		9,026		19,696	
Lines:									
Trot	449	5,327	1,312	320	1,158	17	627	5,757	186
Hooks	35,980	455,000	124,715	16,767	186,250	360	37,395	1,392,200	41,800
Pound nets					2				27
Fyke nets	610	5,346	9,852	335	1,981	189	1,231	5,908	74
Dip nets			22		10			159	
Traps:									
Crawfish								18	
Shrimp								88	
Baskets			3,769						
Mussel dredges		426	14						
Yards at mouth		286	10						
Crowfoot bars	168	1,038	840	1,092	464		256	10	192
Tongs		159		72				5	
Rakes		70							
Forks		102	33	1,278		29		5	
Grabs								2,232	

Item	Mississippi	Missouri	Nebraska	Ohio	Oklahoma	South Dakota	Tennessee	Texas	Wisconsin	Total
Fishermen:										
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	211	177			5		327	5	202	5,153
Casual	198	170	299	49	19	67	206	41	112	10,731
Total	409	347	299	49	24	67	533	46	314	15,884
Boats:										
Motor	138	84	30			2	138	6	160	4,426
Other	329	304	187	49	18	34	467	42	180	10,120
Apparatus:										
Haul seines	16	47	12	2	2	11			83	1,013
Length, yards	6,885	5,668	906	180	60	1,948			20,149	255,779
Anchor gill nets	4	1			3				6	101
Square yards	800	160			990				13,488	45,637
Trammel nets	17	104	115				52			518
Square yards	2,867	14,668	4,833				3,560			63,799
Lines:										
Hand							67			67
Hooks							67			67
Trot	847	516		19	29	18	464	80	3	17,129
Hooks	72,155	34,600		900	1,075	3,600	41,690	14,500	125	2,459,112
Pound nets									345	374
Fyke nets	2,591	1,872	296	76	85	68	1,735	70	222	32,541
Dip nets										191
Traps:										
Crawfish										18
Shrimp	350									438
Baskets										3,769
Spears							12			12
Mussel dredges										440
Yards at mouth										296
Crowfoot bars							230		190	4,480
Tongs		9								245
Rakes										70
Forks										1,447
Grabs										2,232

Fisheries of the Mississippi River and tributaries, 1931—Continued

OPERATING UNITS: BY WATERS

Item	Arkansas River and tributaries			Atchafalaya River	Des Moines River and tributaries			Illinois River and tributaries		
	River proper	Tributaries	Total		River proper	Tributaries	Total	River proper	Tributaries	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore:										
Regular	124	6	130	1,073		9	9	347	6	353
Casual	147	40	187	1,947	183	15	198	261	31	292
Total	271	46	317	3,020	183	24	207	608	37	645
Boats:										
Motor	14		14	440				215	5	220
Other	259	44	303	1,370	126	10	136	239	32	271
Apparatus:										
Haul seines	2	1	3	65		5	5	66	2	68
Length, yards	1,000	50	1,050	32,066		3,565	3,565	26,115	160	26,275
Anchor gill nets		3	3							
Square yards		990	990							
Trammel nets	4		4	28						
Square yards	250		250	6,400						
Lines:										
Trot	510	53	563	2,424				240	38	278
Hooks	58,425	10,065	68,490	614,800				45,400	1,520	46,920
Fyke nets	256	30	286	2,050				6,073	123	6,196
Dip nets				159						
Traps, shrimp				12						
Baskets								1,600	55	1,655
Crowfoot bars								164		164
Forks		29	29						5	5
Grabs				1,771						

Item	Iowa River and tributaries			Lake Des Allemands	Minnesota River and tributaries				Mississippi River and tributaries	
	River proper	Tributaries	Total		River proper	Blue Earth River and tributaries	Minor tributaries [1]	Total	River proper	Cannon River and tributaries
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore:										
Regular				14	14	16	25	55	1,043	6
Casual	7	110	117	26	96	25	56	177	1,439	30
Total	7	110	117	40	110	41	81	232	2,482	36
Boats:										
Motor				24	7			7	1,028	
Other	7	61	68	26	84	16	32	132	1,517	20
Apparatus:										
Haul seines				8	21	7	16	44	443	6
Length, yards				2,600	3,031	5,063	10,227	18,321	87,319	3,299
Anchor gill nets									43	
Square yards									29,314	
Tramme nets									82	
Square yards									10,413	
Lines:										
Trot				96	38			38	3,451	
Hooks				25,200	11,400			11,400	550,650	
Pound nets					23			23	348	
Fyke nets				120	17			17	8,895	
Dip nets									32	
Traps:										
Crawfish				18						
Shrimp				4					422	
Baskets									2,082	
Mussel dredges									13	
Yards at mouth									9	
Crowfoot bars					26	8	6	40	768	22
Forks									5	
Grabs				17					302	

[1] Includes all tributaries not shown separately.

Fisheries of the Mississippi River and tributaries, 1931—Continued

OPERATING UNITS: By WATERS—Continued

Item	Mississippi River and tributaries—Continued				Missouri River and tributaries			Ohio River and tributaries	
	Crow River and tributaries	Reelfoot Lake	Minor tributaries[1]	Total	River proper	Tributaries	Total	River proper	Cumberland River
Fishermen:									
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	5	90	223	1,367	80	41	121	98	28
Casual	62	16	343	1,890	444	67	511	484	96
Total	67	106	566	3,257	524	108	632	582	124
Boats:									
Motor		30	153	1,211	64	8	72	39	5
Other	36	102	444	2,119	402	58	460	518	115
Apparatus:									
Haul seines	12		46	507	27	16	43	61	
Length, yards	6,195		21,095	117,908	3,204	5,513	8,717	5,557	
Anchor gill nets			11	54					
Square yards			6,933	36,247					
Trammel nets		46	26	154	248	16	264		
Square yards		3,150	4,587	18,150	22,472	2,900	25,372		
Lines:									
Hand		67		67					
Hooks		67		67					
Trot		80	1,010	4,541	184	69	253	1,002	172
Hooks		8,000	221,830	780,480	12,285	6,745	19,030	72,015	13,530
Pound nets			1	349	2		2		
Fyke nets		465	1,089	10,449	1,009	229	1,238	1,568	302
Dip nets				32					
Traps, shrimp				422					
Baskets				2,082					
Spears		12		12					
Mussel dredges				13					
Yards at mouth				9					
Crowfoot bars	34		16	840					
Forks				5					
Grabs			20	322					

Item	Ohio River and tributaries—Continued								
	Tennessee River and tributaries			Wabash River and tributaries				Minor tributaries[1]	Total
	River proper	Tributaries	Total	River proper	White River and tributaries	Minor tributaries[1]	Total		
Fishermen:									
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	212		212	22			22	5	365
Casual	364	6	370	872	703	156	1,731	58	2,739
Total	576	6	582	894	703	156	1,753	63	3,104
Boats:									
Motor	158		158	356	205	58	619		821
Other	412	5	417	543	510	101	1,154	60	2,264
Apparatus:									
Haul seines				19			19		80
Length, yards				2,290			2,290		7,847
Trammel nets				3			3		3
Square yards				360			360		360
Lines:									
Trot	578	8	586	185		28	213	122	2,095
Hooks	47,905	460	48,365	7,692		800	8,492	5,490	147,892
Fyke nets	947		947	206		122	328	106	3,251
Baskets				22		10	32		32
Crowfoot bars	654		654	978	288	24	1,290		1,944
Tongs				12	60		72		72
Forks				483	700	118	1,301		1,301

[1] Includes all tributaries not shown separately.

Fisheries of the Mississippi River and tributaries, 1931—Continued

OPERATING UNITS: BY WATERS—Continued

Item	Red River and tributaries							Rock River and tributaries		
	River proper	Black River (Louisiana)	Ouachita River and tributaries			Minor tributaries [1]	Total	River proper	Tributaries	Total
			River proper	Tributaries	Total					
Fishermen:										
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	96	21	30	14	44	24	185	85	2	87
Casual	365	54	159	171	330	160	909	477	93	570
Total	461	75	189	185	374	184	1,094	562	95	657
Boats:										
Motor	261	41	93	25	118	85	505	191	22	213
Other	300	53	166	155	321	156	830	195	28	223
Apparatus:										
Haul seines	59	28	22	39	61	17	165	7		7
Length, yards	14,100	2,800	3,800	3,525	7,325	5,210	29,435	1,010		1,010
Anchor gill nets	12		20	12	32		44			
Square yards	2,400		4,000	2,000	6,000		8,400			
Trammel nets	24			1	1	21	46		2	2
Square yards	6,800			140	140	4,996	11,936		250	250
Lines:										
Trot	1,225	102	383	250	633	288	2,248		221	221
Hooks	249,200	20,400	47,460	42,150	89,610	55,710	414,920		6,030	6,030
Fyke nets	1,545	202	683	556	1,239	282	3,268		74	74
Mussel dredges								1		1
Yards at mouth								1		1
Crowfoot bars			10		10		10	379	47	426
Tongs			5		5		5		9	9
Forks			10		10		10			
Grabs	48	43	10	21	31		122			

Item	St. Francis River and tributaries			White River (Ark. and Mo.) and tributaries			
	River proper	Tributaries	Total	River proper	Black River and tributaries	Minor tributaries [1]	Total
Fishermen:							
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	233	24	257	761	184	76	1,021
Casual	292	27	319	498	146	109	753
Total	525	51	576	1,259	330	185	1,774
Boats:							
Motor	26	6	32	583	141	64	788
Other	512	49	561	825	220	157	1,202
Apparatus:							
Haul seines				10			10
Length, yards				4,200			4,200
Trammel nets				12	3	1	16
Square yards				688	200	60	948
Lines:							
Trot	1,575		1,575	1,416	472	355	2,243
Hooks	51,095		51,095	156,225	37,270	39,290	232,785
Fyke nets	528		528	2,355	665	383	3,403
Mussel dredges				305	103	18	426
Yards at mouth				205	69	12	286
Crowfoot bars	30		30	766	206	36	1,008
Tongs	137		137		22		22
Rakes	3		3	67			67
Forks				97			97

[1] Includes all tributaries not shown separately.

Fisheries of the Mississippi River and tributaries, 1931—Continued

OPERATING UNITS: By waters—Continued

Item	Wisconsin River and tributaries			Yazoo River and tributaries			Grand total
	River proper	Tributaries	Total	River proper	Tributaries	Total	
Fishermen:							
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	4		4	84	28	112	5,153
Casual		9	9	73	14	87	10,731
Total	4	9	13	157	42	199	15,884
Boats:							
Motor	1	5	6	54	19	73	4,426
Other	1	4	5	121	29	150	10,120
Apparatus:							
Haul seines	1		1	2	5	7	1,013
Length, yards	300		300	1,100	1,385	2,485	255,779
Anchor gill nets							101
Square yards							45,637
Trammel nets					1	1	518
Square yards					133	133	63,769
Lines:							
Hand							67
Hooks							67
Trot				450	104	554	17,129
Hooks				36,160	3,910	40,070	2,459,112
Pound nets							374
Fyke nets				1,262	399	1,661	32,541
Dip nets							191
Traps:							
Crawfish							18
Shrimp							438
Baskets							3,769
Spears							12
Mussel dredges							440
Yards at mouth							266
Crowfoot bars		18	18				4,480
Tongs							245
Rakes							70
Forks							1,447
Grabs							2,232

CATCH: By States

Species	Alabama		Arkansas		Illinois		Indiana		Iowa	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			700	$28	8,308	$241			91,825	$3,759
Buffalofish	21,330	$2,342	2,182,446	131,474	911,609	51,893	85,045	$8,156	746,615	59,705
Carp	11,000	1,118	808,206	27,268	4,878,744	128,221	157,641	10,162	1,594,244	80,134
Catfish and bullheads	81,200	8,850	1,077,343	93,150	647,696	68,890	35,370	5,302	467,340	48,593
Crappie	9,772	1,004	11,325	227						
Eels					4,985	322			325	15
Mooneye					1,000	20			1,100	28
Paddlefish or spoonbill cat	3,958	338	93,200	2,159	104,846	5,480	16,492	1,724	9,400	638
Pike or pickerel									4,700	470
Quillback or "American carp"	7,657	875	6,830	676	17,532	608	30,312	1,436	60,450	1,339
Sheepshead	45,909	4,972	676,358	29,877	177,709	11,321	38,740	3,711	343,449	17,619
Sturgeon, shovelnose	575	70			39,766	3,448	3,013	292	17,650	1,663
Sucker "mullet"	5,752	609	3,309	235	25,130	1,087	16,797	1,156	36,550	822
White bass					1,200	92				
Yellow pike							4,550	693		
Total	187,153	20,178	4,859,717	285,094	6,818,525	271,623	387,960	32,632	3,373,648	214,785
SHELLFISH, ETC.										
Mussel shells	1,635,000	10,132	10,872,790	108,819	7,429,528	82,894	7,328,736	105,632	4,366,219	65,685
Pearls				3,137		190		125		7,244
Slugs		2,444		14,401		11,835		18,788		13,924
Terrapin									19,100	377
Turtles:										
Snapper					14,577	696	500	25	2,000	40
Soft-shell							400	20	17,000	340
Total	1,635,000	12,576	10,872,790	126,357	7,444,105	95,615	7,329,636	124,590	4,404,319	87,610
Grand total	1,822,153	32,754	15,732,507	411,451	14,262,630	367,238	7,717,596	157,222	7,777,967	302,395

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Kansas		Kentucky		Louisiana		Minnesota	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					5,715	$114	16,598	$282
Buffalofish	24,325	$2,222	164,558	$14,429	8,784,314	263,261	257,431	15,092
Carp	117,489	10,956	113,461	8,124	204,743	4,127	2,151,119	97,756
Catfish and bullheads	770	111	131,777	17,043	6,602,987	528,579	53,804	4,841
Eels					200	6		
Garfish					72,450	791		
Mooneye			990	105				
Paddlefish or spoonbill cat			18,322	1,617	495,544	21,508		
Quillback or "American carp"	100	11	11,355	984	20,700	431	17,246	519
Sauger			2,365	451				
Sheepshead			52,560	6,762	1,976,600	39,577	152,545	7,938
Sturgeon, shovelnose	175	24	2,967	380			1,634	115
Sucker "mullet"			10,294	1,331			65,273	1,955
Yellow pike			70	18				
Total	142,859	13,324	508,719	51,244	18,163,253	858,394	2,715,650	128,498
SHELLFISH, ETC.								
Crawfish					29,248	292		
Shrimp					38,503	2,423		
Mussel shells	312,562	2,713	1,113,032	8,786	50,000	375	782,630	7,827
Pearls								157
Slugs		636		852				1,174
Frogs					872,651	130,612		
Turtles:								
Snapper					58,013	2,244		
Soft-shell					1,700	34		
Total	312,562	3,349	1,113,032	9,638	1,050,115	135,980	782,630	9,158
Grand total	455,421	16,673	1,621,751	60,882	19,213,368	994,374	3,498,280	137,656

Species	Mississippi		Missouri		Nebraska		Ohio	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			17,000	$520				
Buffalofish	1,511,126	$63,824	178,991	16,414	18,104	$1,813	6,433	$662
Carp	225,276	6,730	433,117	33,356	93,032	9,305	14,370	1,543
Catfish and bullheads	635,049	42,384	91,430	15,487	34,174	5,135	4,380	811
Eels	250	20	1,055	53				
Minnows			525	209				
Paddlefish or spoonbill cat	158,821	5,879	40,103	2,917				
Quillback or "American carp"	2,157	42	13,672	946			1,195	119
Sheepshead	106,844	2,576	38,186	3,773			1,318	224
Sturgeon, shovelnose	100	3	17,282	1,703			558	72
Sucker "mullet"			2,275	292			2,902	268
Yellow pike							325	60
Total	2,639,623	121,458	833,636	75,670	145,310	16,253	31,481	3,759
SHELLFISH, ETC.								
Shrimp	10,000	1,500					154,000	3,005
Mussel shells			94,000	1,193				
Slugs				118				308
Turtles, snapper	100	3						
Total	10,100	1,503	94,000	1,311			154,000	3,313
Grand total	2,649,723	122,961	927,636	76,981	145,310	16,253	185,481	7,072

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Oklahoma		South Dakota		Tennessee	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass					14,000	$1,680
Buffalofish	21,605	$2,142	38,926	$3,894	478,592	34,247
Carp	4,268	425	52,836	2,642	247,841	9,594
Catfish and bullheads	4,935	695	13,500	3,528	271,753	24,750
Crappie			1,392	70	18,652	1,658
Eels					163	25
Paddlefish or spoonbill cat	5,332	533	400	40	5,034	301
Quillback or "American carp"	1,950	195	4,364	220	6,065	843
Sheepshead	1,550	155	697	70	197,670	10,465
Sturgeon, shovelnose					3,706	393
Sucker "mullet"			2,246	112	8,323	1,119
Sunfish					21,850	1,094
White bass					2,100	106
Total	39,640	4,145	114,361	10,576	1,275,749	86,275
SHELLFISH, ETC.						
Mussel shells					2,157,000	15,604
Pearls						28
Slugs						1,724
Frogs					2,250	270
Terrapin					70	14
Total					2,159,320	17,640
Grand total	39,640	4,145	114,361	10,576	3,435,069	103,915

Species	Texas		Wisconsin		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass					14,000	$1,680
Bowfin			288,170	$4,355	428,316	9,299
Buffalofish	73,000	$2,190	268,001	13,528	15,772,451	687,288
Carp	6,900	138	777,474	23,800	11,891,761	455,399
Catfish and bullheads	47,800	3,824	65,539	5,825	10,266,847	877,798
Crappie					41,141	2,959
Eels					6,978	441
Garfish					72,450	791
Minnows					525	209
Mooneye					3,090	153
Paddlefish or spoonbill cat					951,452	43,134
Pike or pickerel					4,700	470
Quillback or "American carp"	500	10	66,353	2,032	268,438	11,286
Sauger					2,365	451
Sheepshead	10,300	206	84,409	3,692	3,904,844	142,938
Sturgeon, shovelnose					87,426	8,163
Sucker "mullet"			135,984	3,696	314,835	12,682
Sunfish					21,850	1,094
White bass					3,300	198
Yellow pike					4,945	771
Total	138,500	6,368	1,685,930	56,928	44,061,714	2,257,204
SHELLFISH, ETC.						
Crawfish					29,248	292
Shrimp					48,503	3,923
Mussel shells			959,200	8,946	37,254,697	421,611
Pearls				555		11,436
Slugs				2,012		68,216
Frogs					874,901	130,882
Terrapin					19,170	391
Turtles:						
Snapper					75,190	3,008
Soft-shell					19,100	394
Total			959,200	11,513	38,320,809	640,153
Grand total	138,500	6,368	2,645,130	68,441	82,382,523	2,897,357

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY WATERS

Species	Arkansas River and tributaries						Atchafalaya River	
	River proper		Tributaries		Total			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	164, 921	$16, 346	12, 905	$1, 271	177, 826	$17, 617	3, 638, 907	$108, 901
Carp	50, 659	5, 066	3, 453	344	54, 112	5, 410	6, 343	126
Catfish and bullheads	117, 919	12, 310	830	88	118, 749	12, 398	3, 998, 234	322, 252
Garfish							650	13
Paddlefish or spoonbill cat	2, 020	100	6, 425	569	8, 445	669	6, 137	361
Quillback or "American carp"	7, 080	709	1, 500	150	8, 580	859		
Sheepshead	93, 984	9, 399	2, 320	232	96, 304	9, 631	1, 101, 591	22, 026
Total	436, 583	43, 930	27, 433	2, 654	464, 016	46, 584	8, 751, 862	453, 679
SHELLFISH, ETC.								
Shrimp							1, 686	168
Mussel shells			312, 562	2, 713	312, 562	2, 713		
Slugs				636		636		
Frogs							451, 056	67, 654
Turtles, snapper							26, 431	1, 613
Total			312, 562	3, 349	312, 562	3, 349	479, 173	69, 435
Grand total	436, 583	43, 930	339, 995	6, 003	776, 578	49, 933	9, 231, 035	523, 114

Species	Des Moines River and tributaries						Illinois River and tributaries	
	River proper		Tributaries		Total		River proper	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin							7, 508	$209
Buffalofish			21, 537	$1, 610	21, 537	$1, 610	512, 987	25, 044
Carp			187, 858	9, 857	187, 858	9, 857	4, 055, 456	96, 077
Catfish and bullheads							228, 044	21, 091
Eels							3, 150	198
Paddlefish or spoonbill cat							10, 961	569
Quillback or "American carp"							1, 172	40
Sheepshead							25, 647	1, 306
Sturgeon, shovelnose							360	36
Sucker "mullet"							8, 640	331
Total			209, 395	11, 467	219, 395	11, 467	4, 853, 925	144, 901
SHELLFISH, ETC.								
Mussel shells	885, 162	$14, 626			885, 162	14, 626	1, 034, 400	8, 341
Pearls		1, 656				1, 656		
Slugs		2, 965				2, 965		719
Turtles, snapper							13, 827	638
Total	885, 162	19, 247			885, 162	19, 247	1, 048, 227	9, 698
Grand total	885, 162	19, 247	209, 395	11, 467	1, 094, 557	30, 714	5, 902, 152	154, 599

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY WATERS—Continued

Species	Illinois River and tributaries—Continued				Iowa River and tributaries			
	Tributaries		Total		River proper		Tributaries	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			7,508	$209				
Buffalofish	4,900	$415	517,887	25,459				
Carp	21,600	1,645	4,077,056	97,722				
Catfish and bullheads	17,200	2,277	245,244	23,368				
Eels			3,150	198				
Paddlefish or spoonbill cat			10,961	569				
Quillback or "American carp"	2,200	116	3,372	156				
Sheepshead	1,100	110	26,747	1,416				
Sturgeon, shovelnose			360	36				
Sucker "mullet"			8,640	331				
Total	47,000	4,563	4,900,925	149,464				
SHELLFISH, ETC.								
Mussel shells	34,900	422	1,069,300	8,763	18,680	$252	659,938	$8,685
Pearls						18		640
Slugs		80		799		54		1,740
Turtles, snapper	500	50	14,327	688				
Total	35,400	552	1,083,627	10,250	18,680	324	659,938	11,065
Grand total	82,400	5,115	5,984,552	159,714	18,680	324	659,938	11,065

Species	Iowa River and tributaries—Con.		Lake Des Allemands		Minnesota River and tributaries			
	Total				River proper		Blue Earth River and tributaries	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					9,545	$159		
Buffalofish			175,011	$5,250	43,492	3,450	54,176	$3,522
Carp			800	16	87,079	3,191	229,898	9,262
Catfish and bullheads			134,464	10,757	20,541	1,841		
Paddlefish or spoonbill cat			2,280	182				
Quillback or "American carp"					6,435	195		
Sheepshead			7,414	148	51,290	2,573	5,875	447
Sucker "mullet"					6,045	177		
Total			319,969	16,353	224,427	11,586	289,949	13,231
SHELLFISH, ETC.								
Crawfish			29,248	292				
Shrimp			317	30				
Mussel shells	678,618	$8,937			38,500	385	37,400	374
Pearls		658						15
Slugs		1,794				25		144
Frogs			11,393	1,608				
Turtles, snapper			8,282	165				
Total	678,618	11,389	49,240	2,095	38,500	410	37,400	533
Grand total	678,618	11,389	369,209	18,448	262,927	11,996	327,349	13,764

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY WATERS—Continued

Species	Minnesota River and tributaries—Continued				Mississippi River and tributaries			
	Tributaries [1]		Total		River proper		Cannon River and tributaries	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			9,545	$159	397,795	$8,649		
Buffalofish	19,900	$1,011	117,568	7,983	2,911,904	159,439	667	$31
Carp	590,357	26,155	907,334	38,608	3,587,513	151,526	103,051	5,083
Catfish and bullheads			20,541	1,841	1,800,370	160,918		
Eels					2,665	138		
Garfish					14,800	148		
Mooneye					2,100	48		
Paddlefish or spoonbill cat					215,424	11,700		
Pike or pickerel					4,700	470		
Quillback or "American carp"			6,435	195	138,594	4,229		
Sheepshead	5,135	207	62,300	3,227	790,757	36,644	17,740	610
Sturgeon, shovelnose					57,794	5,735		
Sucker "mullet"			6,045	177	217,885	5,980		
White bass					100	15		
Total	615,392	27,373	1,129,768	52,190	10,142,401	545,639	121,458	5,724
SHELLFISH, ETC.								
Shrimp					46,500	3,725		
Mussel shells	44,000	440	119,900	1,199	5,234,792	63,368	114,070	1,141
Pearls				15		5,380		47
Slugs		80		249		13,538		304
Frogs					318,719	47,529		
Terrapin					19,100	377		
Turtles:								
Snapper					14,050	284		
Soft-shell					17,700	354		
Total	44,000	520	119,900	1,463	5,650,861	134,555	114,070	1,492
Grand total	659,392	27,893	1,249,668	53,653	15,793,262	680,194	235,528	7,216

Species	Mississippi River and tributaries—Continued							
	Crow River and tributaries		Reelfoot Lake		Minor tributaries [1]		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass			14,000	$1,680			14,000	$1,680
Bowfin					6,453	$114	404,248	8,763
Buffalofish	7,749	$440	238,750	16,643	1,035,516	40,903	4,194,586	217,456
Carp	301,368	14,045	57,850	1,737	459,548	20,454	4,509,330	192,845
Catfish and bullheads			107,950	8,636	877,771	69,830	2,786,091	239,384
Crappie			16,600	1,238			16,600	1,238
Eels							2,665	138
Garfish					11,000	120	25,800	268
Mooneye							2,100	48
Paddlefish or spoonbill cat					212,407	8,439	427,831	20,139
Pike or pickerel							4,700	470
Quillback or "American carp"					7,662	208	146,256	4,437
Sheepshead			89,450	1,789	365,447	9,472	1,263,394	48,515
Sturgeon, shovelnose					1,340	94	59,134	5,829
Sucker "mullet"					21,557	648	239,442	6,628
Sunfish			21,850	1,094			21,850	1,094
White bass			2,100	106			2,200	121
Total	309,117	14,485	548,550	32,923	2,998,701	150,282	14,120,227	749,053
SHELLFISH, ETC.								
Shrimp							46,500	3,725
Mussel shells	225,100	2,251			141,623	1,775	5,715,585	68,535
Pearls		20				350		5,797
Slugs		65				509		14,416
Frogs			2,250	270	2,693	403	323,662	48,202
Terrapin							19,100	377
Turtles:								
Snapper					5,100	103	19,150	387
Soft-shell							17,700	354
Total	225,100	2,336	2,250	270	149,416	3,140	6,141,697	141,793
Grand total	534,217	16,821	550,800	33,193	3,148,117	153,422	20,261,924	890,846

[1] Includes all tributaries not shown separately.

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY WATERS—Continued

Species	Missouri River and tributaries						Ohio River and tributaries	
	River proper		Tributaries		Total		River proper	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin							300	$6
Buffalofish	88,674	$8,584	139,967	$9,853	228,641	$18,437	270,733	23,410
Carp	409,025	38,099	271,998	15,445	681,023	53,544	308,089	19,023
Catfish and bullheads	84,396	15,639	12,443	2,504	96,839	18,143	172,745	23,818
Crappie			1,392	70	1,392	70		
Minnows	525	209			525	209		
Mooneye							990	105
Paddlefish or spoonbill cat	1,115	112	2,000	210	3,115	322	92,457	5,170
Quillback or "American carp"	1,000	66	4,364	220	5,364	286	31,532	2,202
Sauger							2,365	451
Sheepshead	18,894	1,605	6,779	919	25,673	2,524	109,558	11,914
Sturgeon, shovelnose	3,368	376			3,368	376	17,505	1,266
Sucker "mullet"	250	11	4,221	359	4,471	370	25,976	2,444
White bass							1,100	77
Yellow pike							4,945	771
Total	607,247	64,701	443,164	29,580	1,050,411	94,281	1,038,295	90,657
SHELLFISH, ETC.								
Mussel shells			1,000	10	1,000	10		
Grand total	607,247	64,701	444,164	29,590	1,051,411	94,291	1,038,295	90,657

Species	Ohio River and tributaries—Continued							
	Cumberland River		Tennessee River and tributaries					
			River proper		Tributaries		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	21,095	$2,112	52,306	$5,522			52,306	$5,522
Carp	14,550	1,283	25,236	2,261			25,236	2,261
Catfish and bullheads	30,053	4,085	136,298	15,572	480	$96	136,778	15,668
Crappie	2,052	420	9,772	1,004			9,772	1,004
Eels	95	16	68	9			68	9
Paddlefish or spoonbill cat	1,897	183	6,265	631			6,265	631
Quillback or "American carp"	3,630	331	12,732	1,513			12,732	1,513
Sheepshead	24,735	3,634	62,569	7,500	140	28	62,709	7,528
Sturgeon, shovelnose	2,868	304	1,566	171			1,566	171
Sucker "mullet"	4,915	663	9,060	1,082			9,060	1,082
Total	105,890	13,031	315,872	35,265	620	124	316,492	35,389
SHELLFISH, ETC.								
Mussel shells			4,905,032	34,522			4,905,032	34,522
Pearls				28				28
Slugs				5,020				5,020
Terrapin	70	14						
Total	70	14	4,905,032	39,570			4,905,032	39,570
Grand total	105,960	13,045	5,220,904	74,835	620	124	5,221,524	74,959

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY WATERS—Continued

Species	Ohio River and tributaries—Continued							
	Wabash River and tributaries							
	River proper		White River and tributaries		Minor tributaries[1]		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	400	$16			100	$10	500	$26
Buffalofish	30,509	2,153			10,040	878	40,549	3,031
Carp	73,601	3,351			17,350	1,228	90,951	4,579
Catfish and bullheads	41,220	5,941			3,328	482	44,548	6,423
Eels	1,000	80					1,000	80
Paddlefish or spoonbill cat	3,760	259			400	16	4,160	275
Quillback or "American carp"	10,120	229					10,120	229
Sheepshead	19,210	1,551			2,350	195	21,560	1,746
Sturgeon, shovelnose	2,625	181					2,625	181
Sucker "mullet"	6,792	506			175	8	6,967	514
Total	189,237	14,267			33,743	2,817	222,980	17,084
SHELLFISH, ETC.								
Mussel shells	5,480,870	74,870	2,344,866	$34,537	338,000	4,992	8,163,736	114,399
Pearls		125						125
Slugs		12,895		6,363		1,045		20,303
Turtles:								
Snapper	500	25					500	25
Soft-shell	400	20					400	20
Total	5,481,770	87,935	2,344,866	40,900	338,000	6,037	8,164,636	134,872
Grand total	5,671,007	102,202	2,344,866	40,900	371,743	8,854	8,387,616	151,956

Species	Ohio River and tributaries—Con.				Red River and tributaries			
	Minor tributaries[1]		Total		River proper		Black River (Louisiana)	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			800	$32	5,715	$114		
Buffalofish	13,735	$1,077	398,418	35,152	2,178,441	65,407	256,000	$7,680
Carp	4,642	369	443,468	27,515	95,640	1,941	8,600	178
Catfish and bullheads	7,675	753	391,799	50,747	777,258	62,183	108,100	8,648
Crappie			11,824	1,424				
Eels			1,163	105				
Garfish					25,000	300	3,000	30
Mooneye			990	105				
Paddlefish or spoonbill cat	80	10	104,859	6,269	213,521	8,540	13,000	650
Quillback or "American carp"			58,014	4,275	100	2	6,300	146
Sauger			2,365	451				
Sheepshead	1,480	205	220,042	25,027	308,114	6,168	31,350	671
Sturgeon, shovelnose			24,564	1,922				
Sucker "mullet"	825	73	47,743	4,776				
White bass			1,100	77				
Yellow pike			4,945	771				
Total	28,437	2,487	1,712,094	158,648	3,603,789	144,655	426,350	18,003
SHELLFISH, ETC.								
Mussel shells	154,000	3,005	13,222,768	151,926				
Pearls				153				
Slugs		308		25,631				
Frogs					60,900	9,135	16,500	2,475
Terrapin			70	14				
Turtles:								
Snapper			500	25	6,500	130		
Soft-shell			400	20	1,000	20		
Total	154,000	3,313	13,223,738	177,769	68,400	9,285	16,500	2,475
Grand total	182,437	5,800	14,935,832	336,417	3,672,189	153,940	442,850	20,478

[1] Includes all tributaries not shown separately.

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY WATERS—Continued

Species	Red River and tributaries—Continued							
	Ouachita River and tributaries						Minor tributaries [1]	
	River proper		Tributaries		Total			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	407,809	$14,424	462,127	$15,653	869,936	$30,077	484,900	$14,645
Carp	27,728	556	27,600	552	55,328	1,108	14,075	335
Catfish and bullheads	172,606	15,099	173,209	14,193	345,815	29,292	223,690	18,312
Garfish	4,000	40	14,000	140	18,000	180		
Paddlefish or spoonbill cat	7,505	340	10,378	507	17,883	847	15,150	1,215
Quillback or "American carp"	4,800	96	9,100	179	13,900	275	600	20
Sheepshead	71,241	1,933	45,746	1,226	116,987	3,159	57,275	1,152
Sucker "mullet"	1,369	131			1,369	131		
Total	697,058	32,619	742,160	32,450	1,439,218	65,069	795,690	35,679
SHELLFISH, ETC.								
Mussel shells	56,075	421			56,075	421		
Frogs	866	130	10,524	1,678	11,390	1,808		
Total	56,941	551	10,524	1,678	67,465	2,229		
Grand total	753,999	33,170	752,684	34,128	1,506,683	67,298	795,690	35,679

Species	Red River and tributaries—Con.		Rock River and tributaries					
	Total		River proper		Tributaries		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	5,715	$114						
Buffalofish	3,789,277	117,809	19,335	$1,283			19,335	$1,283
Carp	173,643	3,562	92,729	4,513			92,729	4,513
Catfish and bullheads	1,454,863	118,435						
Garfish	46,000	510						
Paddlefish or spoonbill cat	259,554	11,252						
Quillback or "American carp"	20,900	443	8,860	266			8,860	266
Sheepshead	513,726	11,150						
Sucker "mullet"	1,369	131	5,010	127			5,010	127
Total	6,265,047	263,406	125,934	6,189			125,934	6,189
SHELLFISH, ETC.								
Mussel shells	56,075	421	3,945,240	51,334	341,422	$3,863	4,286,662	55,197
Slugs				6,894		368		7,262
Frogs	88,790	13,418						
Turtles:								
Snapper	6,500	130						
Soft-shell	1,000	20						
Total	152,365	13,989	3,945,240	58,228	341,422	4,231	4,286,662	62,459
Grand total	6,417,412	277,395	4,071,174	64,417	341,422	4,231	4,412,596	68,648

[1] Includes all tributaries not shown separately.

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY WATERS—Continued

Species	St. Francis River and tributaries						White River (Ark. and Mo.) and tributaries	
	River proper		Tributaries		Total		River proper	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			500	$22	500	$22		
Buffalofish	102,370	$8,983	13,174	1,055	115,544	10,038	1,062,812	$54,381
Carp	229,995	11,037	33,811	1,699	263,806	12,736	286,951	3,490
Catfish and bullheads	161,895	16,552	24,155	3,003	186,050	19,555	397,806	29,396
Paddlefish or spoonbill cat			584	29	584	29	70,046	1,400
Sheepshead	57,880	4,623	3,035	268	60,915	4,891	370,270	7,791
Sucker "mullet"	970	44	40	2	1,010	46	200	40
Total	553,110	41,239	75,299	6,078	628,409	47,317	2,188,085	96,498
SHELLFISH, ETC.								
Mussel shells	1,464,340	14,740	80,475	761	1,544,815	15,501	7,027,650	70,218
Pearls		560		75		635		1,078
Slugs		2,044		131		2,175		8,697
Total	1,464,340	17,344	80,475	967	1,544,815	18,311	7,027,650	79,993
Grand total	2,017,450	58,583	155,774	7,045	2,173,224	65,628	9,215,735	176,491

Species	White River (Ark. and Mo.) and tributaries—Con.					
	Black River and tributaries		Tributaries [1]		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	268,224	$19,672	182,513	$9,385	1,513,549	$83,438
Carp	64,182	2,640	39,791	558	390,924	6,688
Catfish and bullheads	87,008	8,511	67,919	5,307	552,733	43,214
Crappie			11,325	227	11,325	227
Paddlefish or spoonbill cat			8,730	160	78,776	1,560
Sheepshead	63,952	4,626	40,372	872	474,594	13,289
Sucker "mullet"	905	56			1,105	96
Total	484,271	35,505	350,650	16,509	3,023,006	148,512
SHELLFISH, ETC.						
Mussel shells	1,880,400	18,967	431,700	4,317	9,339,750	93,502
Pearls		1,341		83		2,502
Slugs		2,809		712		12,218
Total	1,880,400	23,117	431,700	5,112	9,339,750	108,222
Grand total	2,364,671	58,622	782,350	21,621	12,362,756	256,734

[1] Includes all tributaries not shown separately.

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY WATERS—Continued

Species	Wisconsin River and tributaries					
	River proper		Tributaries		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	33,000	$1,650			33,000	$1,650
Carp	7,000	265			7,000	265
Quillback or "American carp"	10,000	350			10,000	350
Total	50,000	2,265			50,000	2,265
SHELLFISH, ETC.						
Mussel shells			22,500	$281	22,500	281
Pearls				20		20
Slugs				71		71
Total			22,500	372	22,500	372
Grand total	50,000	2,265	22,500	372	72,500	2,637

Species	Yazoo River and tributaries						Grand total	
	River proper		Tributaries		Total			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass							14,000	$1,680
Bowfin							428,316	9,299
Buffalofish	583,365	$25,085	248,000	$10,120	831,365	$35,205	15,772,451	687,288
Carp	60,435	1,216	35,900	776	96,335	1,992	11,891,761	455,399
Catfish and bullheads	222,840	14,222	58,400	3,482	281,240	17,704	10,266,847	877,798
Crappie							41,141	2,959
Eels							6,978	441
Garfish							72,450	791
Minnows							525	209
Mooneye							3,090	153
Paddlefish or spoonbill cat	44,510	1,626	4,400	156	48,910	1,782	951,452	43,134
Pike or pickerel							4,700	470
Quillback or "American carp"	657	19			657	19	268,438	11,286
Sauger							2,365	451
Sheepshead	44,644	944	7,500	150	52,144	1,094	3,904,844	142,938
Sturgeon, shovelnose							87,426	8,163
Sucker "mullet"							314,335	12,682
Sunfish							21,850	1,094
White bass							3,300	198
Yellow pike							4,945	771
Total	956,451	43,112	354,200	14,684	1,310,651	57,796	44,061,714	2,257,204
SHELLFISH, ETC.								
Crawfish							29,248	292
Shrimp							48,503	3,923
Mussel shells							37,254,697	421,611
Pearls								11,436
Slugs								68,216
Frogs							874,901	130,882
Terrapin							19,170	391
Turtles:								
Snapper							75,190	3,008
Soft-shell							19,100	394
Total							38,320,809	640,153
Grand total	956,451	43,112	354,200	14,684	1,310,651	57,796	82,382,523	2,897,357

ALABAMA

Fisheries of Alabama, 1931

OPERATING UNITS: BY GEAR

Item	Trot lines	Fyke nets	Crowfoot bars	Total, exclusive of duplication
Fishermen:				
On boats and shore:	*Number*	*Number*	*Number*	*Number*
Regular	65	51	38	104
Casual	85	21	46	131
Total	150	72	84	235
Boats:				
Motor	22	9	10	32
Other	113	45	77	190
Apparatus:				
Number	449	610	168	
Hooks	35,980			

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Trot lines		Fyke nets	Crowfoot bars
	Regular	Casual	Total	Motor	Other				
Mississippi River:									
Ohio River: Tennessee River	*Number* 104	*Number* 131	*Number* 235	*Number* 32	*Number* 190	*Number* 449	*Hooks* 35,980	*Number* 610	*Number* 168

CATCH: BY GEAR

Species	Trot lines		Fyke nets		Crowfoot bars		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	13,995	$1,491	7,335	$851			21,330	$2,342
Carp	9,280	935	1,720	183			11,000	1,118
Catfish and bullheads	76,190	8,271	5,010	579			81,200	8,850
Crappie	8,622	867	1,150	137			9,772	1,004
Paddlefish or spoonbill cat	3,272	259	686	79			3,958	338
Quillback or "American carp"	6,512	736	1,145	139			7,657	875
Sheepshead	38,009	4,116	7,900	856			45,909	4,972
Sturgeon, shovelnose	250	37	325	33			575	70
Sucker "mullet"	2,303	280	3,449	329			5,752	609
Mussel shells					1,635,000	$10,132	1,635,000	10,132
Slugs						2,444		2,444
Total	158,433	16,992	28,720	3,186	1,635,000	12,576	1,822,153	32,754

NOTE.—The catch in Alabama was confined to the Tennessee River.

ARKANSAS

Fisheries of Arkansas, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot lines	Fyke nets	Mussel dredges
Fishermen:						
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	45	3	25	666	241	398
Casual	10	2	7	1,246	81	21
Total	55	5	32	1,912	322	419
Boats:						
Motor	14	1	16	332	201	392
Other	17	5	32	1,770	291	33
Apparatus:						
Number	16	4	31	5,327	5,346	426
Length, yards	7,308					
Square yards		2,800	3,899			
Yards at mouth						286
Hooks				455,000		

Item	Crow-foot bars	Tongs	Rakes	Forks	By hand	Total, exclusive of duplication
Fishermen:						
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	497	108	70	18		1,463
Casual	42	51		84	53	1,524
Total	539	159	70	102	53	2,987
Boats:						
Motor	401	4	44			907
Other	118	155	52	98	53	2,359
Apparatus:						
Number	1,038	159	70	102		

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Haul seines	
	Regular	Casual	Total	Motor	Other		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*
Mississippi River	25	47	72	23	72		
Arkansas River	121	143	264	14	254	2	1,000
Minor tributaries	4	4	8		8		
Boggy Bayou		1	1		1		
Cypress Creek		2	2		2		
Horseshoe Lake	4		4	1	1	1	1,333
L'Anguille River	2	5	7		7		
Red River	11	87	98	23	82		
Little River	3	10	13	1	12		
Ouachita River	8	86	94	16	80	1	100
Bayou Bartholomew	3	7	10	3	10		
Massey Lake	1	4	5		1	1	425
Boeuf River		4	4		4		
Little Missouri River		4	4		4		
Saline River	1	22	23		23		
Sulphur River	1	5	6	5	10		
St. Francis River	231	283	514	26	502		
Rainbow Lake	2		2		2		
Tyronza River	1	7	8		8		
Little River and Big Lake	21	20	41	6	39		
White River	759	494	1,253	582	819	10	4,200
Black River	184	133	317	141	207		
Spring River		13	13		13		
Cache River	21	57	78	32	70		
Fork of Little Red River	53	47	100	31	80		
Minor tributaries	1	1	2		2		
Minor tributaries	6	38	44	3	46	1	250
Total	1,463	1,524	2,987	907	2,359	16	7,308

Fisheries of Arkansas, 1931—Continued

OPERATING UNITS: By waters—Continued

Waters	Anchor gill nets		Trammel nets		Trot lines	
	Number	*Square yards*	*Number*	*Square yards*	*Number*	*Hooks*
Mississippi River					235	28,700
Arkansas River			4	250	507	58,325
Minor tributaries					39	9,600
Cypress Creek			1	156	6	205
L'Anguille River					27	520
Red River					167	31,800
Little River					36	7,200
Ouachita River					186	8,060
Bayou Bartholomew					17	2,570
Boeuf River					4	1,350
Little Missouri River					4	165
Saline River			1	140	39	1,865
Sulphur River					15	1,500
St. Francis River					1,566	50,545
Rainbow Lake			2	250		
Tyronza River					23	540
Little River and Big Lake					198	5,490
White River			12	688	1,396	155,100
Black River			3	200	438	36,020
Spring River					34	1,250
Cache River					163	13,725
Fork of Little Red River			1	60	175	24,400
Minor tributaries					3	40
Minor tributaries	4	2,800	7	2,155	49	16,030
Total	4	2,800	31	3,899	5,327	455,000

Waters	Fyke nets	Mussel dredges		Crow-foot bars	Tongs	Rakes	Forks
	Number	*Number*	*Yards at mouth*	*Number*	*Number*	*Number*	*Number*
Mississippi River	465						
Arkansas River	221						
L'Anguille River	27						
Red River	105						
Little River	5						
Ouachita River	339						5
Bayou Bartholomew	75						
Saline River	108						
Sulphur River	16						
St. Francis River	508			30	128	3	
Tyronza River	6				2		
Little River and Big Lake	68				7		
White River	2,355	305	205	766		67	97
Black River	665	103	69	206	22		
Cache River	186	8	5	16			
Fork of Little Red River	185	10	7	20			
Minor tributaries	12						
Total	5,346	426	286	1,038	159	70	102

Fisheries of Arkansas, 1931—Continued

CATCH: BY GEAR AND WATERS

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River:								
Arkansas River			9,019	$902	2,786	$279	62	$10
Horseshoe Lake			28,930	2,314	6,700	536		
Red River:								
Ouachita River			1,140	114	28	2		
Bayou Bartholomew: Massey Lake			3,424	171				
White River			52,246	2,611	12,564	127	537	38
Minor tributaries			6,373	319			41	3
Total			101,132	6,431	22,078	944	640	51
Anchor gill nets:								
Mississippi River:								
Minor tributaries			10,440	514	347	10		
Trammel nets:								
Mississippi River:								
Arkansas River			10,261	1,027	3,970	396	68	10
Boggy Bayou: Cypress Creek			521	26				
Red River: Ouachita River: Saline River			744	74				
St. Francis River: Rainbow Lake			3,554	284	596	48	25	2
White River			21,133	1,037	1,052	10	568	40
Black River			5,786	463	397	16		
Fork of Little Red River			2,646	132	474	5		
Minor tributaries			22,944	1,164	3,225	65	49	3
Total			67,589	4,207	9,714	540	710	55
Trot lines:								
Mississippi River			31,245	1,591	2,835	142	35,494	2,996
Arkansas River			82,559	8,256	30,367	3,037	100,328	9,727
Minor tributaries			2,400	220	500	50	100	15
Boggy Bayou: Cypress Creek							350	25
L'Anguille River			715	59	905	39	705	76
Red River					5,300	106	106,600	8,528
Little River					1,000	20	13,000	1,440
Ouachita River			3,134	306			18,796	2,647
Bayou Bartholomew							3,265	328
Boeuf River							1,005	80
Little Missouri River			45	5			275	33
Saline River							3,318	470
Sulphur River					500	10	6,000	480
St. Francis River			42,535	3,718	120,160	5,786	96,590	9,814
Tyronza River			475	37	1,100	55	680	82
Little River and Big Lake	150	$4	1,320	108	23,585	1,169	22,110	2,752
White River			523,832	27,417	119,950	1,769	246,355	17,833
Black River			86,835	6,671	25,335	998	48,085	4,698
Spring River					3,950	316	2,530	380
Cache River			30,630	1,624	7,080	78	16,765	1,229
Fork of Little Red River			69,800	3,488	11,620	117	31,840	2,228
Minor tributaries			30	3	90	4	125	15
Minor tributaries			40	4	175	9	17,364	1,399
Total	150	4	875,595	53,507	354,452	13,705	771,680	67,275
Fyke nets:								
Mississippi River	200	6	118,173	7,085	75,967	1,764	18,270	1,445
Arkansas River			54,082	5,285	12,936	1,294	13,576	1,986
L'Anguille River			1,460	121	3,760	155	555	62
Red River			80,000	2,400	3,100	62	4,500	360
Little River			5,000	150	100	2	300	24
Ouachita River			37,035	3,009			2,125	318
Bayou Bartholomew			17,244	1,380			1,531	153
Saline River			11,480	1,148			515	65
Sulphur River			16,000	480	1,000	20	1,000	80
St. Francis River			58,980	5,179	107,985	5,125	62,855	6,371
Tyronza River			325	26	430	22	65	8
Little River and Big Lake	350	18	7,500	600	8,100	405	1,275	159
White River			465,401	23,276	153,210	1,556	145,054	10,162
Black River			175,603	12,538	34,500	1,310	36,393	3,433
Cache River			28,244	1,435	3,100	34	7,709	542
Fork of Little Red River			43,930	2,197	12,605	127	8,590	601
Minor tributaries			7,233	506	4,822	193		
Total	550	24	1,127,690	66,815	421,615	12,069	304,313	25,769

Fisheries of Arkansas, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
Total by waters:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mississippi River	200	$6	149,418	$8,676	78,802	$1,906	53,764	$4,441
Arkansas River			155,921	15,470	50,059	5,006	114,034	11,733
Minor tributaries			2,400	220	500	50	100	15
Boggy Bayou:								
Cypress Creek			521	26			350	25
Horseshoe Lake			28,930	2,314	6,700	536		
L'Anguille River			2,175	180	4,665	194	1,260	138
Red River			80,000	2,400	8,400	168	111,100	8,888
Little River			5,000	150	1,100	22	13,300	1,464
Ouachita River			41,309	3,429	28	2	20,921	2,965
Bayou Bartholomew			17,244	1,380			4,796	481
Massey Lake			3,424	171				
Boeuf River							1,005	80
Little Missouri River			45	5			275	33
Saline River			12,224	1,222			3,833	535
Sulphur River			16,000	480	1,500	30	7,000	560
St. Francis River			101,515	8,897	228,145	10,911	159,445	16,185
Rainbow Lake			3,554	284	596	48	25	2
Tyronza River			800	63	1,530	77	745	90
Little River and Big Lake	500	22	8,820	708	31,685	1,574	23,385	2,911
White River			1,062,612	54,341	286,776	3,462	392,514	28,073
Black River			268,224	19,672	60,232	2,324	84,478	8,131
Spring River					3,950	316	2,530	380
Cache River			58,874	3,059	10,180	112	24,474	1,771
Fork of Little Red River			116,376	5,817	24,699	249	40,430	2,829
Minor tributaries			7,263	509	4,912	197	125	15
Minor tributaries			39,797	2,001	3,747	84	17,454	1,405
Total	700	28	2,182,446	131,474	808,206	27,268	1,077,343	93,150

Gear and waters	Crappie		Paddlefish or spoonbill cat		Quillback or "American carp"		Sheepshead	
Haul seines:								
Mississippi River:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Arkansas River			125	$5				
Red River:								
Ouachita River			82	10			11	$1
Bayou Bartholomew:								
Massey Lake			3,486	157				
White River			13,510	271			460	9
Minor tributaries			1,683	67				
Total			18,886	510			471	10
Anchor gill nets:								
Mississippi River:								
Minor tributaries			2,744	83			450	14
Trammel nets:								
Mississippi River:								
Red River:								
Ouachita River:								
Saline River			229	17				
St. Francis River: Rainbow Lake			584	29				
White River			1,101	22			1,122	21
Fork of Little Red River			55	1				
Minor tributaries			1,752	61			307	9
Total			3,721	130			1,429	30

Fisheries of Arkansas, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Crappie		Paddlefish or spoonbill cat		Quillback or "American carp"		Sheepshead	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trot lines:								
Mississippi River							2,960	$258
Arkansas River			1,561	$77	3,985	$399	84,259	8,428
Minor tributaries			1,275	54			1,250	125
L'Anguille River							195	17
Red River							11,300	226
Little River							1,800	36
Ouachita River							2,275	164
Saline River							175	13
Sulphur River							800	16
St. Francis River							34,245	2,529
Tyronza River							245	24
Little River and Big Lake							900	91
White River			49,895	997			161,403	3,527
Black River							41,880	3,129
Cache River			2,705	38			14,505	342
Fork of Little Red River	6,200	$124	4,300	87			20,730	416
Minor tributaries			601	24			65	7
Total	6,200	124	60,337	1,277	3,985	399	378,987	19,348
Fyke nets:								
Mississippi River							4,541	401
Arkansas River			302	15	2,745	275	9,375	938
L'Anguille River							425	40
Red River					100	2	6,300	126
Little River							500	10
Ouachita River							7,655	572
Bayou Bartholomew							2,967	178
Saline River							3,004	223
Sulphur River							1,000	20
St. Francis River							23,410	2,071
Tyronza River							90	9
Little River and Big Lake							1,800	144
White River			5,540	110			206,745	4,132
Black River							22,072	1,497
Cache River			250	5			2,537	65
Fork of Little Red River	5,125	103	1,420	29			2,600	49
Total	5,125	103	7,512	159	2,845	277	295,021	10,475
Total by waters:								
Mississippi River							7,501	659
Arkansas River			1,988	97	6,730	674	93,634	9,366
Minor tributaries			1,275	54			1,250	125
L'Anguille River							620	57
Red River					100	2	17,600	352
Little River							2,300	46
Ouachita River			82	10			9,941	737
Bayou Bartholomew							2,967	178
Massey Lake			3,486	157				
Saline River			229	17			3,179	236
Sulphur River							1,800	36
St. Francis River							57,655	4,600
Rainbow Lake			584	29				
Tyronza River							335	33
Little River and Big Lake							2,700	235
White River			70,046	1,400			369,730	7,689
Black River							63,952	4,626
Cache River			2,955	43			17,042	407
Fork of Little Red River	11,325	227	5,775	117			23,330	465
Minor tributaries			6,780	235			822	30
Total	11,325	227	93,200	2,159	6,830	676	676,358	29,877

Fisheries of Arkansas, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Sucker "mullet"		Mussel shells		Pearls	Slugs	Total	
	Pounds	*Value*	*Pounds*	*Value*	*Value*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River:								
Arkansas River							11,992	$1,196
Horseshoe Lake							35,630	2,850
Red River:								
Ouachita River							1,261	127
Bayou Bartholomew:								
Massey Lake							6,910	328
White River							79,317	3,056
Minor tributaries							8,097	389
Total							143,207	7,946
Anchor gill nets:								
Mississippi River:								
Minor tributaries							13,981	621
Trammel nets:								
Mississippi River:								
Arkansas River							14,299	1,433
Boggy Bayou: Cypress Creek							521	26
Red River:								
Ouachita River:								
Saline River							973	91
St. Francis River: Rainbow Lake							4,759	363
White River							24,976	1,130
Black River							6,183	479
Fork of Little Red River							3,175	138
Minor tributaries							28,277	1,302
Total							83,163	4,962
Trot lines:								
Mississippi River							72,534	4,987
Arkansas River							303,059	29,924
Minor tributaries							5,525	464
Boggy Bayou: Cypress Creek							350	25
L'Anguille River							2,520	191
Red River							123,200	8,860
Little River							15,800	1,496
Ouachita River	1,369	$131					25,574	3,248
Bayou Bartholomew							3,265	328
Boeuf River							1,005	80
Little Missouri River							320	38
Saline River							3,493	483
Sulphur River							7,300	506
St. Francis River							293,530	21,847
Tyronza River							2,500	198
Little River and Big Lake							48,065	4,124
White River							1,101,435	51,543
Black River							202,135	15,496
Spring River	350	28					6,830	724
Cache River							71,685	3,311
Fork of Little Red River							144,490	6,460
Minor tributaries							245	22
Minor trubutaries							18,245	1,443
Total	1,719	159					2,453,105	155,798
Fyke nets:								
Mississippi River	125	7					217,276	10,708
Arkansas River							93,016	9,793
L'Anguille River							6,200	378
Red River							94,000	2,950
Little River							5,900	186
Ouachita River							46,815	3,899
Bayou Bartholomew							21,742	1,711
Saline River							14,999	1,436
Sulphur River							19,000	600
St. Francis River	870	39					254,100	18,785
Tyronza River	40	2					950	67
Little River and Big Lake							19,025	1,326
White River							975,950	39,236
Black River	555	28					269,123	18,806
Cache River							41,840	2,081
Fork of Little Red River							74,270	3,106
Minor tributaries							12,055	699
Total	1,590	76					2,166,261	115,767

Fisheries of Arkansas, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Sucker "mullet"		Mussel shells		Pearls	Slugs	Total	
	Pounds	*Value*	*Pounds*	*Value*	*Value*	*Value*	*Pounds*	*Value*
Mussel dredges:								
Mississippi River:								
White River			2,201,900	$21,990	$246	$2,555	2,201,900	$24,791
Black River			741,500	7,415	101	1,051	741,500	8,567
Cache River			140,000	1,400	16	231	140,000	1,647
Fork of Little Red River			74,200	742	23	123	74,200	888
Total			3,157,600	31,547	386	3,960	3,157,600	35,893
Crowfoot bars:								
Mississippi River:								
St. Francis River			158,610	1,648	70	249	158,610	1,967
White River			3,771,000	37,710	692	4,731	3,771,000	43,133
Black River			924,500	9,245	150	1,353	924,500	10,748
Cache River			140,000	1,400	16	231	140,000	1,647
Fork of Little Red River			77,500	775	28	127	77,500	930
Total			5,071,610	50,778	956	6,691	5,071,610	58,425
Tongs:								
Mississippi River:								
St. Francis River			1,118,300	11,272	415	1,542	1,118,300	13,229
Tyronza River			16,450	148		23	16,450	171
Little River and Big Lake			58,500	531	75	108	58,500	714
White River: Black River			183,900	1,977	945	349	183,900	3,271
Total			1,377,150	13,928	1,435	2,022	1,377,150	17,385
Rakes:								
Mississippi River:								
St. Francis River			24,380	184	55	35	24,380	274
White River			345,750	3,428	26	301	345,750	3,755
Total			370,130	3,612	81	336	370,130	4,029
Forks:								
Mississippi River:								
Red River: Ouachita River			6,075	46			6,075	46
White River			709,000	7,090	114	1,110	709,000	8,314
Total			715,075	7,136	114	1,110	715,075	8,360
By hand:								
Mississippi River:								
Boggy Bayou			4,150	45		26	4,150	71
St. Francis River			141,050	1,361	20	200	141,050	1,581
Tyronza River			5,525	82			5,525	82
White River: Black River			30,500	330	145	56	30,500	531
Total			181,225	1,818	165	282	181,225	2,265
Total by waters:								
Mississippi River	125	$7					289,810	15,695
Arkansas River							422,366	42,346
Minor tributaries							5,525	464
Boggy Bayou			4,150	45		26	4,150	71
Cypress Creek							871	51
Horseshoe Lake							35,630	2,850
L'Anguille River							8,720	569
Red River							217,200	11,810
Little River							21,700	1,682
Ouachita River	1,369	131	6,075	46			79,725	7,320
Bayou Bartholomew							25,007	2,039
Massey Lake							6,910	328
Boeuf River							1,005	80
Little Missouri River							320	38
Saline River							19,465	2,010
Sulphur River							26,300	1,106
St. Francis River	870	39	1,442,340	14,465	560	2,026	1,989,970	57,683
Rainbow Lake							4,759	363
Tyronza River	40	2	21,975	230		23	25,425	518
Little River and Big Lake			58,500	531	75	108	125,590	6,164
White River			7,027,650	70,218	1,078	8,697	9,209,328	174,958
Black River	555	28	1,880,400	18,967	1,341	2,809	2,357,841	57,898
Spring River	350	28					6,830	724
Cache River			280,000	2,800	32	462	393,525	8,686
Fork of Little Red River			151,700	1,517	51	250	373,635	11,522
Minor tributaries							12,300	721
Minor tributaries							68,600	3,755
Total	3,309	235	10,872,790	108,819	3,137	14,401	15,732,507	411,451

ILLINOIS

Fisheries of Illinois, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Trot lines	Fyke nets	Dip nets	Baskets
Fishermen:						
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	323	60	201	441		136
Casual	67	2	241	305	22	42
Total	390	62	442	746	22	178
Boats:						
Motor	122	27	73	245		92
Other	169	16	347	317		51
Apparatus:						
Number	127	28	1,312	9,852	22	3,769
Length, yards	33,975					
Square yards		4,890				
Hooks			124,715			

Item	Mussel dredges	Crowfoot bars	Forks	By hand	Total, exclusive of duplication
Fishermen:					
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	10	131		18	708
Casual	4	336	33	482	1,318
Total	14	467	33	500	2,026
Boats:					
Motor	14	356	20	1	676
Other	5	102	11	263	957
Apparatus:					
Number	14	840	33		
Yards at mouth	10				

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Haul seines		Trammel nets	
	Regular	Casual	Total	Motor	Other				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*	*Number*	*Square yards*
Mississippi River	196	234	430	133	236	46	6,090	28	4,890
Big Muddy River	1	3	4	2	4				
Illinois River	347	261	608	215	239	66	26,115		
Sangamon River	6	17	23	5	19	1	60		
Spring Lake		3	3		3				
Vermilion River		2	2		1	1	100		
Salt Fork of Vermilion River		4	4		4				
Ohio River	56	44	100	27	97	5	500		
Wabash River	15	153	168	78	104	1	100		
Embarras River		6	6		6				
Little Wabash River		21	21	3	21				
Rock River	85	4 7	5 2	191	195	7	1,010		
Kishwaukee River		2	2		2				
Pecatonica River	2	91	93	22	26				
Total	708	1,318	2,026	676	957	127	33,975	28	4,890

Fisheries of Illinois, 1931—Continued

OPERATING UNITS: By waters—Continued

Waters	Trot lines		Fyke nets	Dip nets	Baskets	Mussel dredges		Crowfoot bars	Forks
	Number	*Hooks*	*Number*	*Number*	*Number*	*Number*	*Yards at mouth*	*Number*	*Number*
Mississippi River	528	38,335	2,834	22	2,082	13	9	52	5
Big Muddy River			45						
Illinois River	240	45,400	6,073		1,600			164	
Sangamon River	38	1,520	116		55				
Spring Lake			7						
Ohio River	334	32,400	504						
Wabash River	144	6,260	151		22			198	24
Embarras River			8		10				4
Little Wabash River	28	800	114						
Rock River						1	1	379	
Pecatonica River								47	
Total	1,312	124,715	9,852	22	3,769	14	10	840	33

CATCH: By gear and waters

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River			92,437	$5,439	264,075	$8,457	12,423	$1,467
Illinois River	4,788	$72	310,139	15,117	2,459,602	63,452	66,092	6,072
Sangamon River			200	25	200	16		
Vermilion River			2,000	80	100	5		
Ohio River			2,000	120	1,000	20	2,000	300
Wabash River			185	18	550	33	90	15
Rock River			19,335	1,283	92,729	4,513		
Total	4,788	72	426,296	22,082	2,818,256	76,496	80,605	7,854
Trammel nets: Mississippi River			16,910	889	43,330	1,162	3,970	380
Trot lines:								
Mississippi River					14,627	446	69,404	9,034
Illinois River			535	26	31,923	958	39,938	3,736
Sangamon River					600	48	3,000	390
Ohio River			32,500	2,280	40,100	980	52,575	6,121
Wabash River			2,320	172	12,690	675	23,130	3,438
Little Wabash River			500	50	1,300	124	2,100	310
Total			35,855	2,528	101,210	3,231	190,147	23,029
Fyke nets:								
Mississippi River			134,285	8,788	230,692	9,321	38,637	4,989
Big Muddy River			5,000	575	3,500	300	600	87
Illinois River	2,720	137	202,313	9,901	1,562,606	31,635	77,890	7,226
Sangamon River			2,700	310	18,700	1,496	900	117
Spring Lake					2,000	80		
Ohio River	300	6	65,900	4,773	59,800	1,761	13,000	1,503
Wabash River	400	16	3,810	319	10,760	627	10,640	1,590
Embarras River			840	70	1,020	72	68	9
Little Wabash River	100	10	8,700	758	15,000	1,030	1,050	147
Total	3,520	169	423,548	25,494	1,904,078	46,322	142,785	15,668
Dip nets: Mississippi River			9,000	900	10,275	964		
Baskets:								
Mississippi River							171,940	16,012
Illinois River					1,325	32	44,124	4,057
Sangamon River							13,300	1,770
Ohio River:								
Wabash River					210	12	715	104
Embarras River					30	2	110	16
Total					1,565	46	230,189	21,959

Fisheries of Illinois, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
Total by waters:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mississippi River			252,632	$16,016	562,999	$20,350	296,374	$31,882
Big Muddy River			5,000	575	3,500	300	600	87
Illinois River	7,508	$209	512,987	25,044	4,055,456	96,077	228,044	21,091
Sangamon River			2,900	335	19,500	1,560	17,200	2,277
Spring Lake					2,000	80		
Vermilion River			2,000	80	100	5		
Salt Fork of Vermilion								
Ohio River	300	6	100,400	7,173	100,900	2,761	67,575	7,924
Wabash River	400	16	6,315	509	24,210	1,347	34,575	5,147
Embarras River			840	70	1,050	74	178	25
Little Wabash River	100	10	9,200	808	16,300	1,154	3,150	457
Rock River			19,335	1,283	92,729	4,513		
Total	8,308	241	911,609	51,893	4,878,744	128,221	647,696	68,890

Gear and waters	Eels		Mooneye		Paddlefish or spoonbill cat		Quillback or "American carp"	
Haul seines:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mississippi River			1,000	$20	18,800	$1,774	900	$37
Illinois River					7,974	399	1,172	40
Vermilion River							2,000	100
Ohio River					70,000	2,800		
Rock River							8,860	266
Total			1,000	20	96,774	4,973	12,932	443
Trammel nets: Mississippi River					155	8		
Trot lines:								
Mississippi River	835	$44						
Illinois River	2,050	132						
Ohio River:								
Wabash River	1,000	80						
Total	3,885	256						
Fyke nets:								
Mississippi River					4,530	313	2,000	85
Illinois River	150	9			2,987	170		
Sangamon River							200	16
Ohio River							2,100	58
Wabash River							300	6
Little Wabash River					400	16		
Total	150	9			7,917	499	4,600	165
Baskets:								
Mississippi River; Illinois River	950	57						
Total by waters:								
Mississippi River	835	44	1,000	20	23,485	2,095	2,900	122
Illinois River	3,150	198			10,961	569	1,172	40
Sangamon River							200	16
Vermilion River							2,000	100
Ohio River					70,000	2,800	2,100	58
Wabash River	1,000	80					300	6
Little Wabash River					400	16		
Rock River							8,860	266
Total	4,985	322	1,000	20	104,846	5,480	17,532	608

Fisheries of Illinois, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Sheepshead		Sturgeon, shovelnose		Sucker "mullet"		White bass	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River	63,612	$3,507	2,559	$354	300	$12		
Illinois River	15,742	776			4,950	201		
Ohio River			4,000	240				
Wabash River	30	3						
Rock River					5,010	127		
Total	79,384	4,286	6,559	594	10,260	340		
Trammel nets: Mississippi River	2,740	137	20,350	2,035	960	30		
Trot lines:								
Mississippi River	4,195	203	1,240	123				
Illinois River	200	10	360	36				
Ohio River	23,100	1,653	6,000	270				
Wabash River	8,340	834	1,340	82	80	8		
Little Wabash River	400	34						
Total	36,235	2,734	8,940	511	80	8		
Fyke nets:								
Mississippi River	34,790	2,469	1,217	168	5,995	268	100	$15
Big Muddy River	200	23						
Illinois River	9,705	520			3,690	130		
Sangamon River	1,100	110						
Ohio River	9,900	723	2,200	110	1,650	91	1,100	77
Wabash River	1,060	105	500	30	2,320	212		
Embarras River					50	5		
Little Wabash River	1,950	161			125	3		
Total	58,705	4,111	3,917	308	13,830	709	1,200	92
Dip nets: Mississippi River	645	53						
Total by waters:								
Mississippi River	105,982	6,369	25,366	2,680	7,255	310	100	15
Big Muddy River	200	23						
Illinois River	25,647	1,306	360	36	8,640	331		
Sangamon River	1,100	110						
Ohio River	33,000	2,376	12,200	620	1,650	91	1,100	77
Wabash River	9,430	942	1,840	112	2,400	220		
Embarras River					50	5		
Little Wabash River	2,350	195			125	3		
Rock River					5,010	127		
Total	177,709	11,321	39,766	3,448	25,130	1,087	1,200	92

Gear and waters	Mussel shells		Pearls	Slugs	Turtles, snapper		Total	
	Pounds	*Value*	*Value*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River							456,106	$21,067
Illinois River					11,957	$556	2,882,416	86,685
Sangamon River							400	41
Vermilion River					500	50	4,600	235
Ohio River							79,000	3,480
Wabash River							855	69
Rock River							125,934	6,189
Total					12,457	606	3,549,311	117,766
Trammel nets: Mississippi River							88,415	4,641
Trot lines:								
Mississippi River							90,301	9,850
Illinois River							75,006	4,898
Sangamon River							3,600	438
Ohio River							154,275	11,304
Wabash River							48,900	5,289
Little Wabash River							4,300	518
Total							376,382	32,297

Fisheries of Illinois, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Mussel shells		Pearls	Slugs	Turtles, snapper		Total	
	Pounds	*Value*	*Value*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fyke nets:								
Mississippi River					250	$8	452,496	$26,424
Big Muddy River							9,300	985
Illinois River					1,870	82	1,863,931	49,810
Sangamon River							23,600	2,049
Spring Lake							2,000	80
Ohio River							155,950	9,102
Wabash River							29,790	2,905
Embarras River							1,978	156
Little Wabash River							27,325	2,125
Total					2,120	90	2,566,370	93,636
Dip nets: Mississippi River							19,920	1,917
Baskets:								
Mississippi River							171,940	16,012
Illinois River							46,399	4,146
Sangamon River							13,300	1,770
Ohio River:								
Wabash River							925	116
Embarras River							140	18
Total							232,704	22,062
Mussel dredges:								
Mississippi River	537,500	$4,424		$607			537,500	5,031
Rock River	4,000	34					4,000	34
Total	541,500	4,458		607			541,500	5,065
Crowfoot bars:								
Mississippi River	245,000	2,045	$65	613			245,000	2,723
Illinois River	630,900	5,211		447			630,900	5,658
Ohio River: Wabash River	789,500	8,410		1,440			789,500	9,850
Rock River	3,138,320	41,464		5,853			3,138,320	47,317
Pecatonica River	158,372	1,745		163			158,372	1,908
Total	4,962,092	58,875	65	8,516			4,962,092	67,456
Forks:								
Mississippi River	12,500	104		62			12,500	166
Ohio River:								
Wabash River	54,500	545		110			54,500	655
Embarras River	15,500	155		40			15,500	195
Total	82,500	804		212			82,500	1,016
By hand:								
Mississippi River	443,566	3,594	125	977			443,566	4,696
Illinois River	403,500	3,130		272			403,500	3,402
Sangamon River	8,000	52					8,000	52
Vermilion River: Salt Fork of Vermilion River	1,900	20		5			1,900	25
Ohio River: Wabash River: Little Wabash River	500	7					500	7
Rock River	802,920	9,836		1,041			802,920	10,877
Kishwaukee River	12,000	150					12,000	150
Pecatonica River	171,050	1,968		205			171,050	2,173
Total	1,843,436	18,757	125	2,500			1,843,436	21,382
Total by waters:								
Mississippi River	1,238,566	10,167	190	2,259	250	8	2,517,744	92,527
Big Muddy River							9,300	985
Illinois River	1,034,400	8,341		719	13,827	638	5,902,152	154,599
Sangamon River	8,000	52					48,900	4,350
Spring Lake							2,000	80
Vermilion River					500	50	4,600	235
Salt Fork of Vermilion River	1,900	20		5			1,900	25
Ohio River							389,225	23,886
Wabash River	844,000	8,955		1,550			924,470	18,884
Embarras River	15,500	155		40			17,618	369
Little Wabash River	500	7					32,125	2,650
Rock River	3,945,240	51,334		6,894			4,071,174	64,417
Kishwaukee River	12,000	150					12,000	150
Pecatonica River	329,422	3,713		368			329,422	4,081
Total	7,429,528	82,894	190	11,835	14,577	696	14,262,630	367,238

INDIANA

Fisheries of Indiana, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Trot lines	Fyke nets	Crowfoot bars	Tongs	Forks	By hand	Total, exclusive of duplication
Fishermen:									
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	19			3					20
Casual	83	8	111	88	546	72	1,278	1,060	1,735
Total	102	8	111	91	546	72	1,278	1,060	1,755
Boats:									
Motor	8			1	362	25	450	325	544
Other	49	3	109	86	194	47	833	733	1,189
Apparatus:									
Number	50	3	320	335	1,092	72	1,278		
Length, yards	5,170								
Square yards		360							
Hooks			16,767						

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Haul seines	
	Regular	Casual	Total	Motor	Other		
Mississippi River:							
Illinois River: Kankakee River: Iroquois River	*Number*	*Number* 5	*Number* 5	*Number*	*Number* 5	*Number*	*Length, yards*
Ohio River	13	179	192	6	161	32	2,980
Wabash River	7	719	726	278	439	18	2,190
Tippecanoe River		129	129	55	74		
White River		13	13	5	8		
East Fork of White River		651	651	194	467		
Driftwood River		3	3		3		
West Fork of White River		36	36	6	32		
Total	20	1,735	1,755	544	1,189	50	5,170

Waters	Trammel nets		Trot lines		Fyke nets	Crowfoot bars	Tongs	Forks
Mississippi River:								
Illinois River: Kankakee River: Iroquois River	*Number*	*Square yards*	*Number*	*Hooks*	*Number*	*Number*	*Number*	*Number* 5
Ohio River			279	15,335	280			
Wabash River	3	360	41	1,432	55	780	12	459
Tippecanoe River						24		114
White River						8	2	10
East Fork of White River						280	58	651
Driftwood River								3
West Fork of White River								36
Total	3	360	320	16,767	335	1,092	72	1,278

Fisheries of Indiana, 1931—Continued

CATCH: BY GEAR AND WATERS

Gear and waters	Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River:						
Ohio River	18,061	$1,720	62,790	$3,278	6,082	$786
Wabash River	16,407	1,084	38,984	1,375	950	95
Total	34,468	2,804	101,774	4,653	7,032	881
Trammel nets: Mississippi River:						
Ohio River:						
Wabash River	500	50	700	70	25	4
Trot lines: Mississippi River:						
Ohio River	22,782	2,451	11,225	1,235	12,407	2,028
Wabash River	400	32	1,337	101	2,375	351
Total	23,182	2,483	12,562	1,336	14,782	2,379
Fyke nets: Mississippi River:						
Ohio River	20,008	2,341	34,235	3,645	10,236	1,694
Wabash River	6,887	478	8,370	458	3,295	344
Total	26,895	2,819	42,605	4,103	13,531	2,038
Total by waters: Mississippi River:						
Ohio River	60,851	6,512	108,250	8,158	28,725	4,508
Wabash River	24,194	1,644	49,391	2,004	6,645	794
Total	85,045	8,156	157,641	10,162	35,370	5,302

Gear and waters	Paddlefish or spoonbill cat		Quillback or "American Carp"		Sheepshead	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River:						
Ohio River	11,877	$1,382	11,960	$394	13,440	$974
Wabash River	2,760	209	7,580	162	7,425	448
Total	14,637	1,591	19,540	556	20,865	1,422
Trammel nets: Mississippi River:						
Ohio River:						
Wabash River	------	------	50	3	------	------
Trot lines: Mississippi River:						
Ohio River	------	------	130	14	9,800	1,378
Wabash River	------	------	------	------	200	16
Total	------	------	130	14	10,000	1,394
Fyke nets: Mississippi River:						
Ohio River	855	83	8,402	805	5,720	750
Wabash River	1,000	50	2,190	58	2,155	145
Total	1,855	133	10,592	863	7,875	895
Total by waters: Mississippi River:						
Ohio River	12,732	1,465	20,492	1,213	28,960	3,102
Wabash River	3,760	259	9,820	223	9,780	609
Total	16,492	1,724	30,312	1,436	38,740	3,711

Fisheries of Indiana, 1931—Continued

CATCH: By gear and waters—Continued

Gear and waters	Sturgeon, shovel-nose		Sucker "mullet"		Yellow pike		Mussel shells	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River:								
Ohio River	1,263	$99	6,600	$361	1,300	$195		
Wabash River	450	37	2,902	174				
Total	1,713	136	9,502	535	1,300	195		
Trammel nets: Mississippi River:								
Ohio River:								
Wabash River	100	15	200	16				
Trot lines: Mississippi River:								
Ohio River	850	108						
Wabash River	175	13	40	4				
Total	1,025	121	40	4				
Fyke nets: Mississippi River:								
Ohio River	115	16	5,805	509	3,250	498		
Wabash River	60	4	1,250	92				
Total	175	20	7,055	601	3,250	498		
Crowfoot bars: Mississippi River:								
Ohio River:								
Wabash River							1,321,120	$17,597
Tippecanoe River							24,000	360
White River							14,235	152
East Fork of White River							302,565	4,454
Total							1,661,920	22,563
Tongs: Mississippi River:								
Ohio River:								
Wabash River							48,000	672
White River							9,900	100
East Fork of White River							134,826	2,022
Total							192,726	2,794
Forks: Mississippi River:								
Illinois River:								
Kankakee River:								
Iroquois River							25,000	350
Ohio River:								
Wabash River							2,070,550	29,706
Tippecanoe River							106,000	1,590
White River							48,800	493
East Fork of White River							1,208,350	18,170
Driftwood River							5,000	75
West Fork of White River							228,900	3,435
Total							3,692,600	53,819
By hand: Mississippi River:								
Ohio River:								
Wabash River							1,197,200	17,940
Tippecanoe River							192,000	2,880
White River							31,150	312
East Fork of White River							262,990	3,844
West Fork of White River							98,150	1,480
Total							1,781,490	26,456
Total by waters: Mississippi River:								
Illinois River:								
Kankakee River:								
Iroquis River							25,000	350
Ohio River	2,228	223	12,405	870	4,550	693	4,636,870	65,915
Wabash River	785	69	4,392	286			322,000	4,830
Tippecanoe River							104,085	1,057
White River							1,908,731	28,490
East Fork of White River							5,000	75
Driftwood River							327,050	4,915
West Fork of White River								
Total	3,013	292	16,797	1,156	4,550	693	7,328,736	105,632

Fisheries of Indiana, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Pearls	Slugs	Turtles				Total	
			Snapper		Soft-shell			
	Value	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River:								
Ohio River							133,373	$9,189
Wabash River			500	$25	400	$20	78,358	3,629
Total			500	25	400	20	211,731	12,818
Trammel nets: Mississippi River:								
Ohio River:								
Wabash River							1,575	158
Trot lines: Mississippi River:								
Ohio River							57,194	7,214
Wabash River							4,527	517
Total							61,721	7,731
Fyke nets: Mississippi River:								
Ohio River							88,626	10,341
Wabash River							25,207	1,629
Total							113,833	11,970
Crowfoot bars: Mississippi River:								
Ohio River:								
Wabash River		$3,094					1,321,120	20,691
Tippecanoe River		75					24,000	435
White River		29					14,235	181
East Fork of White River		910					302,565	5,364
Total		4,108					1,661,920	26,671
Tongs: Mississippi River:								
Ohio River:								
Wabash River		120					48,000	792
White River		22					9,900	122
East Fork of White River		402					134,826	2,424
Total		544					192,726	3,338
Forks: Mississippi River:								
Illinois River:								
Kankakee River:								
Iroquois River		75					25,000	425
Ohio River:								
Wabash River		5,192					2,070,550	34,898
Tippecanoe River		330					106,000	1,920
White River		109					48,800	602
East Fork of White River		3,627					1,208,350	21,797
Driftwood River		12					5,000	87
West Fork of White River		250					228,900	3,685
Total		9,595					3,692,600	63,414
By hand: Mississippi River:								
Ohio River:								
Wabash River	$125	2,939					1,197,200	21,004
Tippecanoe River		600					192,000	3,480
White River		68					31,150	380
East Fork of White River		826					262,990	4,670
West Fork of White River		108					98,150	1,588
Total	125	4,541					1,781,490	31,122

Fisheries of Indiana, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Pearls	Slugs	Turtles				Total	
			Snapper		Soft-shell			
Total by waters: Mississippi River:								
Illinois River:								
Kankakee River:	*Value*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Iroquois River		$75					25,000	$425
Ohio River							279,193	26,744
Wabash River	$125	11,345	500	$25	400	$20	4,746,537	83,318
Tippecanoe River		1,005					322,000	5,835
White River		228					104,085	1,285
East Fork of White River		5,765					1,908,731	34,255
Driftwood River		12					5,000	87
West Fork of White River		358					327,050	5,273
Total	125	18,788	500	25	400	20	7,717,596	157,222

IOWA

Fisheries of Iowa, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Trot lines	Pound nets	Fyke nets	Dip nets	Crow-foot bars	By hand	Total, exclusive of duplication
Fishermen:								
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	117	127		191		106		245
Casual	184	183	4	195	10	137	342	648
Total	301	310	4	386	10	243	342	893
Boats:								
Motor	108	187		267		193		309
Other	116	103	2	168		42	235	457
Apparatus:								
Number	133	1,158	2	1,981	10	464		
Length, yards	36,339							
Hooks		186,250						

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Haul seines	
	Regular	Casual	Total	Motor	Other		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*
Mississippi River	245	273	518	309	191	125	34,774
Des Moines River		183	183		126		
Iowa River		7	7		7		
Cedar River		108	108		59		
Shell Rock River		2	2		2		
Missouri River		33	33		31	8	1,565
Big Sioux River		2	2		2		
Skunk River		6	6		6		
Wapsipinicon River		34	34		33		
Total	245	648	893	309	457	133	36,339

Fisheries of Iowa, 1931—Continued

OPERATING UNITS: BY WATERS—Continued

Waters	Trot lines		Pound nets	Fyke nets	Dip nets	Crowfoot bars
	Number	*Hooks*	*Number*	*Number*	*Number*	*Number*
Mississippi River	1,029	179,800	----	1,855	10	464
Missouri River	129	6,450	2	126	----	----
Total	1,158	186,250	2	1,981	10	464

CATCH: BY GEAR AND WATERS

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River	89,725	$3,701	261,562	$20,774	701,054	$33,961	65,200	$6,520
Missouri River	----	----	5,000	460	33,000	2,640	1,950	340
Total	89,725	3,701	266,562	21,234	734,054	36,601	67,150	6,860
Trot lines: Mississippi River	----	----	----	----	64,600	3,116	321,290	32,129
Missouri River	----	----	----	----	5,290	423	13,400	2,680
Total	----	----	----	----	69,890	3,539	334,690	34,809
Pound nets: Mississippi River:								
Missouri River	----	----	1,000	100	7,000	560	1,000	200
Fyke nets: Mississippi River	2,100	58	476,453	38,115	741,000	36,050	59,800	5,980
Missouri River	----	----	2,600	256	42,300	3,384	4,200	694
Total	2,100	58	479,053	38,371	783,300	39,434	64,000	6,674
Dip nets: Mississippi River	----	----	----	----	----	----	500	50
Total by waters: Mississippi River	91,825	3,759	738,015	58,889	1,506,654	73,127	446,790	44,679
Missouri River	----	----	8,600	816	87,590	7,007	20,550	3,914
Total	91,825	3,759	746,615	59,705	1,594,244	80,134	467,340	48,593

Gear and waters	Eels		Mooneye		Paddlefish or spoonbill cat		Pike or pickerel	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River	325	$15	1,100	$28	9,400	$638	4,700	$470

Gear and waters	Quillback or "American carp"		Sheepshead		Sturgeon, shovel-nose	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River	35,150	$743	156,100	$7,805	17,200	$1,609
Missouri River	700	35	3,800	306	150	30
Total	35,850	778	159,900	8,111	17,350	1,639
Trot lines: Mississippi River	----	----	40,800	2,055	----	----
Missouri River	----	----	4,050	319	----	----
Total	----	----	44,850	2,374	----	----
Pound nets: Mississippi River:						
Missouri River	----	----	1,600	128	----	----
Fyke nets: Mississippi River	24,600	561	132,149	6,607	300	24
Missouri River	----	----	4,950	399	----	----
Total	24,600	561	137,099	7,006	300	24
Total by waters: Mississippi River	59,750	1,304	329,049	16,467	17,500	1,633
Missouri River	700	35	14,400	1,152	150	30
Total	60,450	1,339	343,449	17,619	17,650	1,663

Fisheries of Iowa, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Sucker "mullet"		Mussel shells		Pearls	Slugs
	Pounds	*Value*	*Pounds*	*Value*	*Value*	*Value*
Haul seines: Mississippi River	25,200	$529				
Missouri River	150	7				
Total	25,350	536				
Fyke nets: Mississippi River	5,100	102				
Missouri River	100	4				
Total	5,200	106				
Dip nets: Mississippi River	6,000	180				
Crowfoot bars: Mississippi River			2,671,266	$40,455	$4,580	$8,762
By hand: Mississippi River:						
Des Moines River			885,162	14,626	1,656	2,965
Iowa River			18,680	252	18	54
Cedar River			655,938	8,625	640	1,740
Shell Rock River			4,000	60		
Missouri River: Big Sioux River			1,000	10		
Skunk River			26,580	304		30
Wapsipinicon River			103,593	1,353	350	373
Total			1,694,953	25,230	2,664	5,162
Total by waters: Mississippi River	36,300	811	2,671,266	40,455	4,580	8,762
Des Moines River			885,162	14,626	1,656	2,965
Iowa River			18,680	252	18	54
Cedar River			655,938	8,625	640	1,740
Shell Rock River			4,000	60		
Missouri River	250	11				
Big Sioux River			1,000	10		
Skunk River			26,580	304		30
Wapsipinicon River			103,593	1,353	350	373
Total	36,550	822	4,366,219	65,685	7,244	13,924

Gear and waters	Turtles				Terrapin		Total	
	Snapper		Soft-shell					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River	2,000	$40	17,000	$340	18,900	$373	1,404,616	$77,546
Missouri River							44,750	3,818
Total	2,000	40	17,000	340	18,900	373	1,449,366	81,364
Trot lines: Mississippi River							426,690	37,300
Missouri River							22,740	3,422
Total							449,430	40,722
Pound nets: Mississippi River:								
Missouri River							10,600	988
Fyke nets: Mississippi River					200	4	1,441,702	87,501
Missouri River							54,150	4,737
Total					200	4	1,495,852	92,238
Dip nets: Mississippi River							6,500	230
Crowfoot bars: Mississippi River							2,671,266	53,797
By hand: Mississippi River:								
Des Moines River							885,162	19,247
Iowa River							18,680	324
Cedar River							655,938	11,005
Shell Rock River							4,000	60
Missouri River: Big Sioux River							1,000	10
Skunk River							26,580	334
Wapsipinicon River							103,593	2,076
Total							1,694,953	33,056
Total by waters: Mississippi River	2,000	40	17,000	340	19,100	377	5,950,774	256,374
Des Moines River							885,162	19,247
Iowa River							18,680	324
Cedar River							655,938	11,005
Shell Rock River							4,000	60
Missouri River							132,240	12,965
Big Sioux River							1,000	10
Skunk River							26,580	334
Wapsipinicon River							103,593	2,076
Total	2,000	40	17,000	340	19,100	377	7,777,967	302,395

KANSAS

Fisheries of Kansas, 1931

OPERATING UNITS: BY GEAR

Item	Trammel nets	Trot lines	Fyke nets	Forks	Total, exclusive of duplication
Fishermen:					
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	35	3	24		35
Casual	59	2	24	29	88
Total	94	5	48	29	123
Boats:					
Motor	16	2	15		18
Other	93	5	47	29	123
Apparatus:					
Number	90	17	189	29	
Square yards	9,026				
Hooks		360			

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Trammel nets		Trot lines		Fyke nets	Forks
	Regular	Casual	Total	Motor	Other						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Square yards*	*Number*	*Hooks*	*Number*	*Number*
Mississippi River:											
Missouri River	35	59	94	18	94	90	9,026	17	360	189	
Arkansas River:											
Neosho River		29	29		29						29
Total	35	88	123	18	123	90	9,026	17	360	189	29

CATCH: BY GEAR AND WATERS

Gear and waters	Buffalofish		Carp		Catfish and bullheads		Quillback or "American carp"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trammel nets: Mississippi River: Missouri River	20,172	$1,842	98,383	$9,144	183	$22	100	$11
Trot lines; Mississippi River: Missouri River					587	89		
Fyke nets: Mississippi River: Missouri River	4,153	380	19,106	1,812				
Total by waters: Mississippi River: Missouri River	24,325	2,222	117,489	10,956	770	111	100	11

Gear and waters	Sturgeon, shovelnose		Mussel shells		Slugs	Total	
	Pounds	*Value*	*Pounds*	*Value*	*Value*	*Pounds*	*Value*
Trammel nets: Mississippi River: Missouri River	175	$24				119,013	$11,043
Trot lines: Mississippi River: Missouri River						587	89
Fyke nets: Mississippi River: Missouri River						23,259	2,192
Forks: Mississippi River: Arkansas River: Neosho River			312,562	$2,713	$636	312,562	3,349
Total by waters: Mississippi River: Missouri River	175	24				142,859	13,324
Arkansas River: Neosho River			312,562	2,713	636	312,562	3,349
Total	175	24	312,562	2,713	636	455,421	16,673

KENTUCKY

Fisheries of Kentucky, 1931

OPERATING UNITS: By gear

Item	Haul seines	Trot lines	Fyke nets	Crowfoot bars	Total, exclusive of duplication
Fishermen:					
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	3	57	46	30	89
Casual	36	271	179	95	440
Total	39	328	225	125	529
Boats:					
Motor	3	16	8	79	92
Other	23	300	206	49	420
Apparatus:					
Number	24	627	1,231	256	----------
Length, yards	2,057	----------	----------	----------	----------
Hooks	----------	37,395	----------	----------	----------

OPERATING UNITS: By waters

Waters	Fishermen			Boats		Haul seines		Trot lines		Fyke nets	Crowfoot bars
	Regular	Casual	Total	Motor	Other						
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*	*Number*	*Hooks*	*Number*	*Number*
Mississippi River	5	11	16	4	13	2	160	22	1,200	81	-------
Ohio River	29	234	263	6	233	22	1,897	370	23,380	708	-------
Cumberland River	10	37	47	-------	46	-------	-------	58	3,300	159	-------
Green River	2	15	17	-------	17	-------	-------	36	1,800	71	-------
Barren River	3	21	24	-------	21	-------	-------	86	3,690	35	-------
Tennessee River	40	122	162	82	90	-------	-------	55	4,025	177	256
Total	89	440	529	92	420	24	2,057	627	37,395	1,231	256

CATCH: By gear and waters

Gear and waters	Buffalofish		Carp		Catfish and bullheads		Mooneye	
Haul seines:								
Mississippi River:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Ohio River	2,215	$234	2,960	$319	1,070	$154	-------	-------
Total	2,215	234	2,960	319	1,070	154	-------	-------
Trot lines:								
Mississippi River	-------	-------	90	6	5,815	810	-------	-------
Ohio River	20,789	1,812	18,874	1,775	32,697	4,759	-------	-------
Cumberland River	3,827	336	1,363	70	2,998	272	-------	-------
Green River	3,120	218	682	46	1,655	123	-------	-------
Barren River	1,525	153	1,105	111	835	125	-------	-------
Tennessee River	4,545	484	810	61	5,530	669	-------	-------
Total	33,806	3,003	22,924	2,069	49,530	6,758	-------	-------
Fyke nets:								
Mississippi River	9,960	877	8,825	388	5,509	814	-------	-------
Ohio River	80,045	7,017	62,735	4,467	38,298	5,662	990	$105
Cumberland River	13,102	1,145	4,622	211	7,360	701	-------	-------
Green River	7,040	501	1,930	119	3,810	299	-------	-------
Barren River	2,050	205	925	93	1,375	206	-------	-------
Tennessee River	16,340	1,447	8,540	458	24,825	2,449	-------	-------
Total	128,537	11,192	87,577	5,736	81,177	10,131	990	105
Total by waters:								
Mississippi River	9,960	877	8,915	394	11,324	1,624	-------	-------
Ohio River	103,049	9,063	84,569	6,561	72,065	10,575	990	105
Cumberland River	16,929	1,481	5,985	281	10,358	973	-------	-------
Green River	10,160	719	2,612	165	5,465	422	-------	-------
Barren River	3,575	358	2,030	204	2,210	331	-------	-------
Tennessee River	20,885	1,931	9,350	519	30,355	3,118	-------	-------
Total	164,558	14,429	113,461	8,124	131,777	17,043	990	105

Fisheries of Kentucky, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Paddlefish or spoonbill cat		Quillback or "American carp"		Sauger	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River	4,400	$305				
Ohio River	7,500	700	1,000	$78	180	$27
Total	11,900	1,005	1,000	78	180	27
Trot lines:						
Mississippi River:						
Ohio River	600	63	30	3		
Cumberland River	50	5				
Tennessee River			200	10		
Total	650	68	230	13		
Fyke nets:						
Mississippi River	1,402	92	970	46		
Ohio River	1,625	142	6,715	731	2,185	424
Cumberland River	1,210	110	2,015	95		
Green River	80	10				
Tennessee River	1,455	190	425	21		
Total	5,772	544	10,125	893	2,185	424
Total by waters:						
Mississippi River	5,802	397	970	46		
Ohio River	9,725	905	7,745	812	2,365	451
Cumberland River	1,260	115	2,015	95		
Green River	80	10				
Tennessee River	1,455	190	625	31		
Total	18,322	1,617	11,355	984	2,365	451

Gear and waters	Sheepshead		Sturgeon, shovelnose		Sucker "mullet"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River:						
Ohio River	4,540	$1,053	170	$25	170	$10
Trot lines:						
Mississippi River	160	8				
Ohio River	8,565	1,676	1,007	220		
Green River	15	1				
Barren River					475	48
Total	8,740	1,685	1,007	220	475	48
Fyke nets:						
Mississippi River	1,175	59	295	17	150	13
Ohio River	33,175	3,483	1,342	106	8,849	1,205
Cumberland River	2,320	163	53	2		
Green River	160	8			350	25
Barren River	1,305	196				
Tennessee River	1,145	115	100	10	300	30
Total	39,280	4,024	1,790	135	9,649	1,273
Total by waters:						
Mississippi River	1,335	67	295	17	150	13
Ohio River	46,280	6,212	2,519	351	9,019	1,215
Cumberland River	2,320	163	53	2		
Green River	175	9			350	25
Barren River	1,305	196			475	48
Tennessee River	1,145	115	100	10	300	30
Total	52,560	6,762	2,967	380	10,294	1,331

Fisheries of Kentucky, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Yellow pike		Mussel shells		Slugs	Total	
	Pounds	*Value*	*Pounds*	*Value*	*Value*	*Pounds*	*Value*
Haul seines:							
Mississippi River						4,400	$305
Ohio River						19,805	2,600
Total						24,205	2,905
Trot lines:							
Mississippi River						6,065	824
Ohio River						82,562	10,308
Cumberland River						8,238	683
Green River						5,472	388
Barren River						3,940	437
Tennessee River						11,085	1,224
Total						117,362	13,864
Fyke nets:							
Mississippi River						28,286	2,306
Ohio River	70	$18				236,029	23,360
Cumberland River						30,682	2,427
Green River						13,370	962
Barren River						5,655	700
Tennessee River						53,130	4,720
Total	70	18				367,152	34,475
Crowfoot bars:							
Mississippi River:							
Ohio River:							
Tennessee River			1,113,032	$8,786	$852	1,113,032	9,638
Total by waters:							
Mississippi River						38,751	3,435
Ohio River	70	18				338,396	36,268
Cumberland River						38,920	3,110
Green River						18,842	1,350
Barren River						9,595	1,137
Tennessee River			1,113,032	8,786	852	1,177,247	15,582
Total	70	18	1,113,032	8,786	852	1,621,751	60,882

LOUISIANA

Fisheries of Louisiana, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot lines	Fyke nets	Dip nets
Fishermen:						
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	148	14	13	428	377	
Casual	633	50	51	1,439	1,007	59
Total	781	64	64	1,867	1,384	59
Boats:						
Motor	218	38	52	872	912	10
Other	238	33	14	786	1,621	49
Apparatus:						
Number	377	74	78	5,757	5,908	159
Length, yards	85,166					
Square yards		17,400	19,696			
Hooks				1,392,200		

Fisheries of Louisiana, 1931—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Crawfish traps	Shrimp traps	Crowfoot bars	Tongs	Forks	Grabs	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore:							
Regular		8				890	1,402
Casual	6	28	5	5	5	2,144	3,108
Total	6	36	5	5	5	3,034	4,510
Boats:							
Motor		27	2			196	1,225
Other	6	15	5	5	5	1,394	2,369
Apparatus:							
Number	18	88	10	5	5	2,232	

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Haul seines	
	Regular	Casual	Total	Motor	Other		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*
Mississippi River	101	389	490	205	317	118	13,800
Atchafalaya River	1,073	1,947	3,020	440	1,370	65	32,066
Lake Des Allemands	14	26	40	24	26	8	2,600
Lake Larto	62	115	177	105	100	24	7,800
Red River	85	275	360	238	216	59	14,100
Black River	21	54	75	41	53	28	2,800
Caddo Lake	2	30	32	18	22		
Dorcheat Bayou	10	41	51	40	46	6	600
Ouachita River	22	73	95	77	86	21	3,700
Bayou Bartholomew	2	10	12	3	11		
Boeuf River		40	40	4	25	25	1,800
Little River and Catahoula Lake	4	36	40	11	34	3	300
Tensas River	1	18	19	4	20	6	600
Bayou Macon	2	26	28		23	4	400
Minor tributaries	3	28	31	15	20	10	4,600
Total	1,402	3,108	4,510	1,225	2,369	377	85,166

Waters	Anchor gill nets		Trammel nets		Trot lines		Fyke nets
	Number	*Square yards*	*Number*	*Square yards*	*Number*	*Hooks*	*Number*
Mississippi River	30	9,000	5	1,500	924	231,800	658
Atchafalaya River			28	6,400	2,424	614,800	2,050
Lake Des Allemands					96	25,200	120
Lake Larto					625	175,000	550
Red River	12	2,400	24	6,800	1,058	217,400	1,425
Black River					102	20,400	202
Caddo Lake			16	4,221	30	6,000	50
Dorcheat Bayou			3	300	85	17,000	105
Ouachita River	20	4,000			197	39,400	344
Bayou Bartholomew	12	2,000			15	3,000	39
Boeuf River					41	7,200	59
Little River and Catahoula Lake					77	15,400	115
Tensas River					35	7,000	65
Bayou Macon					18	3,600	95
Minor tributaries			2	475	30	9,000	31
Total	74	17,400	78	19,696	5,757	1,392,200	5,908

Fisheries of Louisiana, 1931—Continued

OPERATING UNITS: By waters—Continued

Waters	Dip nets	Crawfish traps	Shrimp traps	Crowfoot bars	Tongs	Forks	Grabs
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Mississippi River			72				302
Atchafalaya River	159		12				1,771
Lake Des Allemands		18	4				17
Lake Larto							20
Red River							48
Black River							43
Ouachita River				10	5	5	10
Tensas River							1
Bayou Macon							20
Total	159	18	88	10	5	5	2,232

CATCH: By gear and waters

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River			158,645	$4,759	20,000	$400	23,783	$1,902
Atchafalaya River			479,403	14,418	2,000	40	329,246	26,339
Lake Des Allemands			70,409	2,112	300	6	17,500	1,400
Lake Larto			193,000	5,790	3,000	60	259,000	20,720
Red River	5,000	$100	385,741	11,572	30,000	600	68,128	5,450
Black River			51,000	1,530	1,700	34	8,500	680
Dorcheat Bayou			14,000	420	200	4	2,800	224
Ouachita River			67,500	2,025	4,000	80	5,500	440
Boeuf River			28,000	840	400	8	1,000	80
Little River and Catahoula Lake			15,000	450	1,000	20	1,000	80
Tensas River			10,000	300	1,000	20	1,000	80
Bayou Macon			3,000	90	500	10	500	40
Minor tributaries			35,000	1,050			4,000	320
Total	5,000	100	1,510,698	45,356	64,100	1,282	721,957	57,755
Anchor gill nets:								
Mississippi River			10,000	300	1,600	32	1,000	80
Red River			6,000	180	200	6	500	40
Ouachita River			15,000	450	3,000	60	2,000	160
Bayou Bartholomew			12,000	360	300	6	3,000	240
Total			43,000	1,290	5,100	104	6,500	520
Trammel nets:								
Mississippi River			3,500	105	500	10	300	24
Atchafalaya River			29,117	873			5,321	425
Red River			72,000	2,160	20,800	419	7,000	560
Caddo Lake			30,000	900	600	15	1,000	80
Dorcheat Bayou			2,500	75			2,000	160
Minor tributaries			10,000	300			1,500	120
Total			147,117	4,413	21,900	444	17,121	1,369
Trot lines:								
Mississippi River					3,300	66	499,900	37,742
Atchafalaya River							3,306,636	266,929
Lake Des Allemands							114,000	9,120
Lake Larto					2,500	50	355,061	28,604
Red River					1,800	39	546,000	43,680
Black River					1,800	42	93,000	7,440
Caddo Lake					700	14	18,000	1,440
Dorcheat Bayou					800	16	67,000	5,360
Ouachita River					6,600	132	132,000	10,560
Bayou Bartholomew					300	6	9,000	720
Boeuf River					1,000	20	24,000	1,920
Little River and Catahoula Lake					3,300	66	69,000	5,520
Tensas River					1,500	30	28,000	2,240
Bayou Macon					600	12	7,500	600
Minor tributaries							45,000	3,600
Total					24,200	493	5,314,097	425,475

Fisheries of Louisiana, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fyke nets:								
Mississippi River			646,320	$19,389	8,700	$176	28,732	$2,298
Atchafalaya River			3,130,387	93,610	4,343	86	357,031	28,559
Lake Des Allemands			104,602	3,138	500	10	2,964	237
Lake Larto			420,000	12,600	3,000	60	58,000	4,640
Red River	715	$14	1,634,000	49,020	34,300	695	44,500	3,560
Black River			205,000	6,150	5,100	102	6,600	528
Caddo Lake			50,000	1,500	700	19	1,500	120
Dorcheat Bayou			186,000	5,580	1,000	20	10,500	840
Ouachita River			284,000	8,520	14,100	282	12,185	974
Bayou Bartholomew			39,000	1,170	800	16	5,000	400
Boeuf River			52,000	1,560	1,700	34	2,400	192
Little River and Catahoula Lake			115,000	3,450	5,600	112	4,300	344
Tensas River			65,000	1,950	6,000	120	3,600	288
Bayou Macon			90,190	2,705	3,600	72	4,000	320
Minor tributaries			62,000	1,860			2,000	160
Total	715	14	7,083,499	212,202	89,443	1,804	543,312	43,460
Total by waters:								
Mississippi River			818,465	24,553	34,100	684	553,715	42,046
Atchafalaya River			3,638,907	108,901	6,343	126	3,998,234	322,252
Lake Des Allemands			175,011	5,250	800	16	134,464	10,757
Lake Larto			613,000	18,390	8,500	170	672,061	53,964
Red River	5,715	114	2,097,741	62,932	87,100	1,759	666,128	53,290
Black River			256,000	7,680	8,600	178	108,100	8,648
Caddo Lake			80,000	2,400	2,000	48	20,500	1,640
Dorcheat Bayou			202,500	6,075	2,000	40	82,300	6,584
Ouachita River			366,500	10,995	27,700	554	151,685	12,134
Bayou Bartholomew			51,000	1,530	1,400	28	17,000	1,360
Boeuf River			80,000	2,400	3,100	62	27,400	2,192
Little River and Catahoula Lake			130,000	3,900	9,900	198	74,300	5,944
Tensas River			75,000	2,250	8,500	170	32,600	2,608
Bayou Macon			93,190	2,795	4,700	94	12,000	960
Minor tributaries			107,000	3,210			52,500	4,200
Total	5,715	114	8,784,314	263,261	204,743	4,127	6,602,987	528,579

Gear and waters	Eels		Garfish		Paddlefish or spoonbill cat		Quillback or "American carp"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River			14,800	$148	101,254	$4,467		
Atchafalaya River			650	13	6,137	361		
Lake Des Allemands					2,280	182		
Lake Larto			11,000	120	126,766	5,270		
Red River			25,000	300	213,521	8,540		
Black River			3,000	30	13,000	650	3,500	$70
Ouachita River			4,000	40	7,423	330	1,000	20
Boeuf River			3,000	30			500	10
Little River and Catahoula Lake			10,000	100				
Tensas River			1,000	10	6,663	333	1,000	20
Bayou Macon							300	3
Minor tributaries					10,000	800		
Total			72,450	791	487,044	20,933	6,300	123
Anchor gill nets:								
Mississippi River					3,500	175		
Red River:								
Ouachita River							500	10
Bayou Bartholomew							200	4
Total					3,500	175	700	14
Trammel nets:								
Mississippi River: Red River: Minor tributaries					5,000	400		
Trot lines:								
Mississippi River	200	$6						

Fisheries of Louisiana, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Eels		Garfish		Paddlefish or spoonbill cat		Quillback or "American carp"	
Fyke nets:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mississippi River							500	$10
Red River:								
Black River							2,800	76
Ouachita River							3,300	66
Bayou Bartholomew							500	10
Boeuf River							1,300	26
Little River and Catahoula Lake							2,400	48
Tensas River							1,700	34
Bayou Macon							1,200	24
Total							13,700	294
Total by waters:								
Mississippi River	200	$6	14,800	$148	104,754	$4,642	500	10
Atchafalaya River			650	13	6,137	361		
Lake Des Allemands					2,280	182		
Lake Larto			11,000	120	126,766	5,270		
Red River			25,000	300	213,521	8,540		
Black River			3,000	30	13,000	650	6,300	146
Ouachita River			4,000	40	7,423	330	4,800	96
Bayou Bartholomew							700	14
Boeuf River			3,000	30			1,800	36
Little River and Catahoula Lake			10,000	100			2,400	48
Tensas River			1,000	10	6,663	333	2,700	54
Bayou Macon							1,500	27
Minor tributaries					15,000	1,200		
Total	200	6	72,450	791	495,544	21,508	20,700	431

Gear and waters	Sheepshead		Crawfish		Shrimp		Mussel shells	
Haul seines:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mississippi River	46,131	$922						
Atchafalaya River	226,377	4,525						
Lake Des Allemands	3,000	60						
Lake Larto	211,000	4,220						
Red River	120,859	2,417						
Black River	5,550	111						
Dorcheat Bayou	3,500	70						
Ouachita River	18,000	350						
Boeuf River	2,500	50						
Little River and Catahoula Lake	2,000	40						
Tensas River	2,000	40						
Bayou Macon	800	16						
Minor tributaries	5,000	100						
Total	646,717	12,921						
Anchor gill nets:								
Mississippi River	10,000	200						
Red River	1,000	20						
Ouachita River	3,000	60						
Bayou Bartholomew	400	8						
Total	14,400	288						
Trammel nets:								
Mississippi River	700	14						
Atchafalaya River	8,254	165						
Red River	8,000	160						
Caddo Lake	1,500	30						
Dorcheat Bayou	2,000	40						
Total	20,454	409						

Fisheries of Louisiana, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Sheepshead		Crawfish		Shrimp		Mussel shells	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trot lines:								
Mississippi River	32,450	$667						
Atchafalaya River	77,055	1,539						
Lake Des Allemands	1,500	30						
Lake Larto	27,555	551						
Red River	61,800	1,236						
Black River	5,300	130						
Caddo Lake	2,000	40						
Dorcheat Bayou	9,800	196						
Ouachita River	14,300	266						
Bayou Bartholomew	500	10						
Boeuf River	2,000	60						
Little River and Catahoula Lake	4,100	82						
Tensas River	2,000	40						
Bayou Macon	1,500	30						
Minor tributaries	1,500	30						
Total	243,360	4,907						
Fyke nets:								
Mississippi River	29,750	595						
Atchafalaya River	789,905	15,797						
Lake Des Allemands	2,914	58						
Lake Larto	44,500	890						
Red River	98,800	1,976						
Black River	20,500	430						
Caddo Lake	4,500	90						
Dorcheat Bayou	10,000	200						
Ouachita River	26,000	520						
Bayou Bartholomew	1,500	30						
Boeuf River	5,700	114						
Little River and Catahoula Lake	5,800	116						
Tensas River	4,300	86						
Bayou Macon	4,500	90						
Minor tributaries	3,000	60						
Total	1,051,669	21,052						
Traps, crawfish:								
Mississippi River: Lake Des Allemands			29,248	$292				
Traps, shrimp:								
Mississippi River					36,500	$2,225		
Atchafalaya River					1,686	168		
Lake Des Allemands					317	30		
Total					38,503	2,423		
Crowfoot bars:								
Mississippi River: Red River: Ouachita River							30,000	$225
Tongs:								
Mississippi River: Red River: Ouachita River							10,000	75
Forks:								
Mississippi River: Red River: Ouachita River							10,000	75
Total by waters:								
Mississippi River	119,031	2,398			36,500	2,225		
Atchafalaya River	1,101,591	22,026			1,686	168		
Lake Des Allemands	7,414	148	29,248	292	317	30		
Lake Larto	283,055	5,661						
Red River	290,459	5,809						
Black River	31,350	671						
Caddo Lake	8,000	160						
Dorcheat Bayou	25,300	506						
Ouachita River	61,300	1,196					50,000	375
Bayou Bartholomew	2,400	48						
Boeuf River	10,200	224						
Little River and Catahoula Lake	11,900	238						
Tensas River	8,300	166						
Bayou Macon	6,800	136						
Minor tributaries	9,500	190						
Total	1,976,600	39,577	29,248	292	38,503	2,423	50,000	375

Fisheries of Louisiana, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Frogs		Turtles				Total	
			Snapper		Soft-shell			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River			9,800	$196	700	$14	375,113	$12,808
Atchafalaya River			19,359	385			1,063,172	46,081
Lake Des Allemands			8,282	165			101,771	3,925
Lake Larto			5,000	100			808,766	36,280
Red River			4,000	80			852,249	29,059
Black River							86,250	3,105
Dorcheat Bayou							20,500	718
Ouachita River							107,423	3,285
Boeuf River							35,400	1,018
Little River and Catahoula Lake							29,000	690
Tensas River							22,663	03
Bayou Macon							5,100	159
Minor tributaries							54,000	2,270
Total			46,441	926	700	14	3,561,407	140,201
Anchor gill nets:								
Mississippi River							26,100	787
Red River							7,700	246
Ouachita River							23,500	740
Bayou Bartholomew							15,900	618
Total							73,200	2,391
Trammel nets:								
Mississippi River							5,000	153
Atchafalaya River							42,692	1,463
Red River							107,800	3,299
Caddo Lake							33,100	1,025
Dorcheat Bayou							6,500	275
Minor tributaries							16,500	820
Total							211,592	7,035
Trot lines:								
Mississippi River			2,000	40			537,850	38,521
Atchafalaya River			1,499	29			3,385,190	268,497
Lake Des Allemands							115,500	9,150
Lake Larto							385,116	29,205
Red River							609,600	44,955
Black River							100,100	7,612
Caddo Lake							20,700	1,494
Dorcheat Bayou							77,600	5,572
Ouachita River							152,900	10,958
Bayou Bartholomew							9,800	736
Boeuf River							27,000	2,000
Little River and Catahoula Lake							76,400	5,668
Tensas River							31,500	2,310
Bayou Macon							9,600	642
Minor tributaries							46,500	3,630
Total			3,499	69			5,585,356	430,950
Fyke nets:								
Mississippi River							714,002	22,468
Atchafalaya River			1,500	30			4,283,166	138,082
Lake Des Allemands							110,980	3,443
Lake Larto							525,500	18,190
Red River			2,500	50	1,000	20	1,815,815	55,335
Black River							240,000	7,286
Caddo Lake							56,700	1,729
Dorcheat Bayou							207,500	6,640
Ouachita River							339,585	10,362
Bayou Bartholomew							46,800	1,626
Boeuf River							63,100	1,926
Little River and Catahoula Lake							133,100	4,070
Tensas River							80,600	2,478
Bayou Macon							103,490	3,211
Minor tributaries							67,000	2,080
Total			4,000	80	1,000	20	8,787,338	278,926

Fisheries of Louisiana, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Frogs		Turtles				Total	
			Snapper		Soft-shell			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Dip nets:								
Mississippi River: Atchafalaya River			3,625	$1,160			3,625	$1,160
Traps, crawfish:								
Mississippi River: Lake Des Allemands							29,248	292
Traps, shrimp:								
Mississippi River							36,500	2,225
Atchafalaya River							1,686	168
Lake Des Allemands							317	30
Total							38,503	2,423
Crowfoot bars:								
Mississippi River: Red River: Ouachita River							30,000	225
Tongs:								
Mississippi River: Red River: Ouachita River							10,000	75
Forks:								
Mississippi River: Red River: Ouachita River							10,000	75
Grabs:								
Mississippi River	318,719	$47,529					318,719	47,529
Atchafalaya River	451,056	67,654	448	9			451,504	67,663
Lake Des Allemands	11,393	1,608					11,393	1,608
Lake Larto	2,693	403					2,693	403
Red River	60,900	9,135					60,900	9,135
Black River	16,500	2,475					16,500	2,475
Ouachita River	866	130					866	130
Tensas River	300	45					300	45
Bayou Macon	10,224	1,633					10,224	1,633
Total	872,651	130,612	448	9			873,099	130,621
Total by waters:								
Mississippi River	318,719	47,529	11,800	236	700	$14	2,013,284	124,491
Atchafalaya River	451,056	67,654	26,431	1,613			9,231,035	523,114
Lake Des Allemands	11,393	1,608	8,282	165			369,209	18,448
Lake Larto	2,693	403	5,000	100			1,722,075	84,078
Red River	60,900	9,135	6,550	130	1,000	20	3,454,064	142,029
Black River	16,500	2,475					442,850	20,478
Caddo Lake							110,500	4,248
Dorcheat Bayou							312,100	13,205
Ouachita River	866	130					674,274	25,850
Bayou Bartholomew							72,500	2,980
Boeuf River							125,500	4,944
Little River and Catahoula Lake							238,500	10,428
Tensas River	300	45					135,063	5,636
Bayou Macon	10,224	1,633					128,414	5,645
Minor tributaries							184,000	8,800
Total	872,651	130,612	58,013	2,244	1,700	34	19,213,368	994,374

MINNESOTA

Fisheries of Minnesota, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trot lines	Pound nets	Fyke nets	Crowfoot bars	Total, exclusive of duplication
Fishermen:							
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	145	9	4	6	14	3	160
Casual	274	6	182	20	17	93	578
Total	419	15	186	26	31	96	738
Boats:							
Motor	39	9		5	10	10	65
Other	166	9	186	20	9	86	446
Apparatus:							
Number	113	9	186	27	74	192	
Length, yards	49,968						
Square yards		9,999					
Hooks			41,800				

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Haul seines	
	Regular	Casual	Total	Motor	Other		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*
Mississippi River	38	205	243	50	162	27	7,061
Cannon River		15	15		12	1	500
Minor tributaries	6	15	21		8	5	2,799
Crow River	2	15	17		17		
Minor tributaries	3	47	50		19	12	6,195
Des Moines River:							
Minor tributaries	9	15	24		10	5	3,565
Minnesota River	14	96	110	7	84	21	3,031
Blue Earth River		4	4		4		
Minor tributaries	16	21	37		12	7	5,063
Pomme de Terre River	1	2	3		3		
Minor tributaries	24	54	78		29	16	10,227
Missouri River:							
Big Sioux River—							
Minor tributaries	17	6	23	1	8	3	2,765
St. Croix River	8	48	56	7	50	5	1,898
Vermilion River	6	3	9		5	2	599
Minor tributaries	8	3	11		4	2	1,499
Whitewater River		2	2		2		
Rochester Lake		2	2		1	1	400
Minor tributaries	8	25	33		16	6	4,366
Total	160	578	738	65	446	113	49,968

Waters	Anchor gill nets		Trot lines		Pound nets	Fyke nets	Crowfoot bars
	Number	*Square yards*	*Number*	*Hooks*	*Number*	*Number*	*Number*
Mississippi River	6	6,666	107	21,400	3	57	80
Cannon River							22
Crow River							34
Minnesota River			38	11,400	23	17	26
Blue Earth River							8
Pomme de Terre River							6
St. Croix River	3	3,333	39	8,600	1		8
Whitewater River			2	400			
Minor tributaries							8
Total	9	9,999	186	41,800	27	74	192

Fisheries of Minnesota, 1931—Continued

CATCH: BY GEAR AND WATERS

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River	600	$9	20,868	$1,044	157,596	$6,383	14,278	$1,287
Cannon River					2,622	105		
Minor tributaries			667	31	100,429	4,978		
Crow River: Minor tributaries			7,749	440	301,368	14,045		
Des Moines River: Minor tributaries			21,537	1,610	187,858	9,857		
Minnesota River	2,560	38	27,657	2,233	63,776	2,370	6,986	606
Blue Earth River: Minor tributaries			54,176	3,522	229,898	9,262		
Minor tributaries			19,900	1,011	590,357	26,155		
Missouri River: Big Sioux River: Minor tributaries			72,890	3,119	163,989	7,820		
St. Croix River	3,078	46	7,534	377	53,366	2,137	7,331	659
Vermilion River	3,375	68	20	2	44,731	1,823		
Minor tributaries			432	42	86,238	4,454		
Whitewater River: Rochester Lake					2,935	160		
Minor tributaries			1,811	126	107,743	5,964		
Total	9,613	161	235,241	13,557	2,092,906	95,513	28,595	2,552
Anchor gill nets:								
Mississippi River			2,490	125	18,985	773		
St. Croix River					2,800	112		
Total			2,490	125	21,785	885		
Trot lines:								
Mississippi River			360	17	4,849	207	7,016	635
Minnesota River					4,880	203	6,825	636
St. Croix River					712	29	2,219	200
Whitewater River					100	4	42	4
Total			360	17	10,541	443	16,102	1,475
Pound nets:								
Mississippi River			185	9	3,950	158	195	16
Minnesota River	2,910	43	3,670	183	7,045	292	4,915	435
St. Croix River			700	35			300	27
Total	2,910	43	4,555	227	10,995	450	5,410	478
Fyke nets:								
Mississippi River			2,620	132	3,514	139	1,882	172
Minnesota River	4,075	78	12,165	1,034	11,378	326	1,815	164
Total	4,075	78	14,785	1,166	14,892	465	3,697	336
Total by waters:								
Mississippi River	600	9	26,523	1,327	188,894	7,660	23,371	2,110
Cannon River					2,622	105		
Minor tributaries			667	31	100,429	4,978		
Crow River: Minor tributaries			7,749	440	301,368	14,045		
Des Moines River: Minor tributaries			21,537	1,610	187,858	9,857		
Minnesota River	9,545	159	43,492	3,450	87,079	3,191	20,541	1,841
Blue Earth River: Minor tributaries			54,176	3,522	229,898	9,262		
Minor tributaries			19,900	1,011	590,357	26,155		
Missouri River: Big Sioux River: Minor tributaries			72,890	3,119	163,989	7,820		
St. Croix River	3,078	46	8,234	412	56,878	2,278	9,850	886
Vermilion River	3,375	68	20	2	44,731	1,823		
Minor tributaries			432	42	86,238	4,454		
Whitewater River					100	4	42	4
Rochester Lake					2,935	160		
Minor tributaries			1,811	126	107,743	5,964		
Total	16,598	282	257,431	15,092	2,151,119	97,756	53,804	4,841

Fisheries of Minnesota, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Quillback or "American carp"		Sheepshead		Sturgeon, shovelnose		Sucker "mullet"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River	4,649	$139	36,830	$2,000			35,315	$1,059
Cannon River: Minor tributaries			17,740	610				
Minnesota River	3,575	108	25,822	1,298			3,645	105
Blue Earth River: Minor tributaries			5,875	447				
Minor tributaries			5,135	207				
St. Croix River	6,162	185	25,187	1,511	920	$64	19,877	597
Vermilion River: Minor tributaries			230	16				
Total	14,386	432	116,819	6,089	920	64	58,837	1,761
Anchor gill nets: Mississippi River			1,045	52	284	20	900	27
Trot lines:								
Mississippi River			4,940	274	10	1	1,375	42
Minnesota River			3,555	216				
St. Croix River			833	49	420	30	1,240	37
Whitewater River							40	1
Total			9,328	539	430	31	2,655	80
Pound nets:								
Mississippi River			220	13			140	4
Minnesota River	1,185	36	4,615	276			1,540	46
St. Croix River			2,000	120			150	5
Total	1,185	36	6,835	409			1,830	55
Fyke nets:								
Mississippi River			1,220	66			191	6
Minnesota River	1,675	51	17,298	783			860	26
Total	1,675	51	18,518	849			1,051	32
Total by waters:								
Mississippi River	4,649	139	44,255	2,405	294	21	37,921	1,138
Cannon River: Minor tributaries			17,740	610				
Minnesota River	6,435	195	51,290	2,573			6,045	177
Blue Earth River: Minor tributaries			5,875	447				
Minor tributaries			5,135	207				
St. Croix River	6,162	185	28,020	1,680	1,430	94	21,267	639
Vermilion River: Minor tributaries			230	16				
Whitewater River							40	1
Total	17,246	519	152,545	7,938	1,634	115	65,273	1,955

Fisheries of Minnesota, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Mussel shells		Pearls	Slugs	Total	
	Pounds	*Value*	*Value*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River					270,136	$11,921
Cannon River					2,622	105
Minor tributaries					118,836	5,619
Crow River: Minor tributaries					309,117	14,485
Des Moines River: Minor tributaries					209,395	11,467
Minnesota River					134,021	6,758
Blue Earth River: Minor tributaries					289,949	13,231
Minor tributaries					615,392	27,373
Missouri River: Big Sioux River: Minor tributaries					236,879	10,939
St. Croix River					123,455	5,576
Vermilion River					48,126	1,893
Minor tributaries					86,900	4,512
Whitewater River: Rochester Lake					2,935	160
Minor tributaries					109,554	6,090
Total					2,557,317	120,129
Anchor gill nets:						
Mississippi River					23,704	997
St. Croix River					2,800	112
Total					26,504	1,109
Trot lines:						
Mississippi River					18,550	1,176
Minnesota River					15,260	1,055
St. Croix River					5,424	345
Whitewater River					182	9
Total					39,416	2,585
Pound nets:						
Mississippi River					4,690	200
Minnesota River					25,880	1,311
St. Croix River					3,150	187
Total					33,720	1,698
Fyke nets:						
Mississippi River					9,427	515
Minnesota River					49,266	2,462
Total					58,693	2,977
Crowfoot bars:						
Mississippi River	316,260	$3,163	$75	$476	316,260	3,714
Cannon River	114,070	1,141	47	304	114,070	1,492
Crow River	225,100	2,251	20	65	225,100	2,336
Minnesota River	38,500	385		25	38,500	410
Blue Earth River	37,400	374	15	144	37,400	533
Pomme de Terre River	44,000	440		80	44,000	520
Minor tributaries	7,300	73		80	7,300	153
Total	782,630	7,827	157	1,174	782,630	9,158
Total by waters:						
Mississippi River	316,260	3,163	75	476	642,767	18,523
Cannon River	114,070	1,141	47	304	116,692	1,597
Minor tributaries					118,836	5,619
Crow River	225,100	2,251	20	65	225,100	2,336
Minor tributaries					309,117	14,485
Des Moines River: Minor tributaries					209,395	11,467
Minnesota River	38,500	385		25	262,927	11,996
Blue Earth River	37,400	374	15	144	37,400	533
Minor tributaries					289,949	13,231
Pomme de Terre River	44,000	440		80	44,000	520
Minor tributaries					615,392	27,373
Missouri River:						
Big Sioux River: Minor tributaries					236,879	10,939
St. Croix River					134,829	6,220
Vermilion River					48,126	1,893
Minor tributaries					86,900	4,512
Whitewater River					182	9
Rochester Lake					2,935	160
Minor tributaries	7,300	73		80	116,854	6,243
Total	782,630	7,827	157	1,174	3,498,280	137,656

MISSISSIPPI

Fisheries of Mississippi, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot lines	Fyke nets	Shrimp traps	Total, exclusive of duplication
Fishermen:							
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	40	4	13	139	162		211
Casual	33		18	148	36	20	198
Total	73	4	31	287	198	20	409
Boats:							
Motor	11	1	5	101	126		138
Other	27	4	17	254	147	20	329
Apparatus:							
Number	16	4	17	847	2,591	350	
Length, yards	6,885						
Square yards		800	2,867				
Hooks				72,155			

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Haul seines	
	Regular	Casual	Total	Motor	Other		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*
Mississippi River	72	64	136	56	111	5	1,450
Beulah Lake	3	1	4	1	3	1	400
Big Black River	2	13	15	2	15		
Flower Lake	3		3		3		
Lake Washington		28	28	3	27	2	2,250
Moon Lake	17		17	1	17		
Yazoo River	84	73	157	54	121	2	1,100
Sunflower River	20	14	34	13	21	5	1,385
Steele Bayou	8		8	6	8		
Minor tributaries	2	5	7	2	3	1	300
Total	211	198	409	138	329	16	6,885

Waters	Anchor gill nets		Trammel nets		Trot lines		Fyke nets	Shrimp traps
	Number	*Square yards*	*Number*	*Square yards*	*Number*	*Hooks*	*Number*	*Number*
Mississippi River			4	868	163	21,110	874	350
Beulah Lake					4	2,000		
Big Black River					65	3,175	46	
Flower Lake			3	600	3	300		
Lake Washington			8	1,066	30	3,000		
Moon Lake	4	800	1	200	22	2,200		
Yazoo River					450	36,160	1,262	
Sunflower River					104	3,910	260	
Steele Bayou			1	133			139	
Minor tributaries					6	300	10	
Total	4	800	17	2,867	847	72,155	2,591	350

Fisheries of Mississippi, 1931—Continued

CATCH: BY GEAR AND WATERS

Gear and waters	Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River	80,500	$3,520	13,000	$520	10,600	$710
Beulah Lake	35,000	1,400	15,000	300	1,000	60
Lake Washington	44,392	1,776	5,406	90	1,179	70
Yazoo River	65,000	2,600	7,000	140	12,000	820
Sunflower River	96,000	4,040	3,700	124	1,000	57
Minor tributaries	5,500	220				
Total	326,392	13,556	44,106	1,174	25,779	1,717
Anchor gill nets:						
Mississippi River: Moon Lake	7,500	375	7,500	300		
Trammel nets:						
Mississippi River	9,000	720	12,000	960	300	30
Flower Lake	10,000	400	4,000	160	500	40
Lake Washington	104,869	4,193	9,985	173	2,830	145
Moon Lake	2,500	125	2,500	100		
Yazoo River: Steele Bayou	3,000	120	600	12	300	18
Total	129,369	5,558	29,085	1,405	3,930	233
Trot lines:						
Mississippi River	4,500	180			126,500	8,630
Big Black River	500	30			25,000	2,050
Flower Lake					5,000	400
Lake Washington					30,000	1,800
Moon Lake	3,000	150			15,000	1,500
Yazoo River			95	4	159,714	9,974
Sunflower River					34,500	2,000
Minor tributaries					12,000	740
Total	8,000	360	95	4	407,714	27,094
Fyke nets:						
Mississippi River	357,000	14,875	59,050	2,119	114,900	7,885
Big Black River	5,500	255	400	14	8,000	560
Yazoo River	518,365	22,485	53,340	1,072	51,126	3,428
Steele Bayou	77,000	3,080	25,400	508	12,300	858
Sunflower River	72,000	2,880	6,200	132	10,300	549
Minor tributaries	10,000	400	100	2	1,000	60
Total	1,039,865	43,975	144,490	3,847	197,626	13,340
Total by waters:						
Mississippi River	451,000	19,295	84,050	3,599	252,300	17,255
Beulah Lake	35,000	1,400	15,000	300	1,000	60
Big Black River	6,000	285	400	14	33,000	2,610
Flower Lake	10,000	400	4,000	160	5,500	440
Lake Washington	149,261	5,969	15,391	263	34,009	2,015
Moon Lake	13,000	650	10,000	400	15,000	1,500
Yazoo River	583,365	25,085	60,435	1,216	222,840	14,222
Sunflower River	168,000	6,920	9,900	256	45,800	2,606
Steele Bayou	80,000	3,200	26,000	520	12,600	876
Minor tributaries	15,500	620	100	2	13,000	800
Total	1,511,126	63,824	225,276	6,730	635,049	42,384

Gear and waters	Eels		Paddlefish or spoonbill cat		Quillback or "American carp"		Sheepshead	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River			23,500	$875			8,500	$205
Beulah Lake			10,000	300			2,000	40
Lake Washington			33,956	1,123	500	$8		
Yazoo River			30,000	1,050			7,000	140
Sunflower River			800	32			700	14
Minor tributaries			200	8			300	6
Total			98,456	3,388	500	8	18,500	405

Fisheries of Mississippi, 1931—Continued

CATCH: By GEAR AND WATERS—Continued

Gear and waters	Eels		Paddlefish or spoonbill cat		Quillback or "American carp"		Sheepshead	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trammel nets:								
Mississippi River							150	$6
Flower Lake							1,000	30
Lake Washington			11,330	$373	1,000	$15		
Yazoo River: Steele Bayou			300	12			750	15
Total			11,630	385	1,000	15	1,900	51
Trot lines:								
Mississippi River	250	$20	1,900	51			3,900	122
Beulah Lake			1,500	60				
Big Black River							400	24
Moon Lake			20,000	1,000			3,000	90
Yazoo River							2,410	62
Sunflower River			2,000	60				
Total	250	20	25,400	1,171			9,710	298
Fyke nets:								
Mississippi River			7,425	301			33,800	903
Big Black River			100	6			650	36
Yazoo River			14,510	576	657	19	35,234	742
Steele Bayou							1,250	25
Sunflower River			1,300	52			4,800	96
Minor tributaries							1,000	20
Total			23,335	935	657	19	76,734	1,822
Total by waters:								
Mississippi River	250	20	32,825	1,227			46,350	1,236
Beulah Lake			11,500	360			2,000	40
Big Black River			100	6			1,050	60
Flower Lake							1,000	30
Lake Washington			45,286	1,496	1,500	23		
Moon Lake			20,000	1,000			3,000	90
Yazoo River			44,510	1,626	657	19	44,644	944
Sunflower River			4,100	144			5,500	110
Steele Bayou			300	12			2,000	40
Minor tributaries			200	8			1,300	26
Total	250	20	158,821	5,879	2,157	42	106,844	2,576

Gear and waters	Sturgeon, shovelnose		Shrimp		Turtles, snapper		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River							136,100	$5,830
Beulah Lake							63,000	2,100
Lake Washington							85,433	3,067
Yazoo River							121,000	4,750
Sunflower River							102,200	4,267
Minor tributaries							6,000	234
Total							513,733	20,248
Anchor gill nets:								
Mississippi River: Moon Lake							15,000	675
Trammel nets:								
Mississippi River							21,450	1,716
Flower Lake							15,500	630
Lake Washington							130,014	4,899
Moon Lake							5,000	225
Yazoo River: Steele Bayou							4,950	177
Total							176,914	7,647

Fisheries of Mississippi, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Sturgeon, shovelnose		Shrimp		Turtles, snapper		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trot lines:								
Mississippi River	100	$3					137,150	$9,006
Beulah Lake							1,500	60
Big Black River					100	$3	26,000	2,107
Flower Lake							5,000	400
Lake Washington							30,000	1,800
Moon Lake							41,000	2,740
Yazoo River							162,219	10,040
Sunflower River							36,500	2,060
Minor tributaries							12,000	740
Total	100	3			100	3	451,369	28,953
Fyke nets:								
Mississippi River							572,175	26,083
Big Black River							14,650	871
Yazoo River							673,232	28,322
Steele Bayou							115,950	4,471
Sunflower River							94,600	3,709
Minor tributaries							12,100	482
Total							1,482,707	63,938
Shrimp traps:								
Mississippi River			10,000	$1,500			10,000	1,500
Total by waters:								
Mississippi River	100	3	10,000	1,500			876,875	44,135
Beulah Lake							64,500	2,160
Big Black River					100	3	40,650	2,978
Flower Lake							20,500	1,030
Lake Washington							245,447	9,766
Moon Lake							61,000	3,640
Yazoo River							956,451	43,112
Sunflower River							233,300	10,036
Steele Bayou							120,900	4,648
Minor tributaries							30,100	1,456
Total	100	3	10,000	1,500	100	3	2,649,723	122,961

MISSOURI

Fisheries of Missouri, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot lines	Fyke nets	Tongs	By hand	Total, exclusive of duplication
Fishermen:								
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	49	1	80	64	132			177
Casual	48	1	47	54	64	9	30	170
Total	97	2	127	118	196	9	30	347
Boats:								
Motor	33	1	41	40	71			84
Other	87	2	114	116	189	8	8	304
Apparatus:								
Number	47	1	104	516	1,872	9		
Length, yards	5,668							
Square yards		160	14,668					
Hooks				34,600				

Fisheries of Missouri, 1931—Continued

OPERATING UNITS: By waters

Waters	Fishermen			Boats		Haul seines	
	Regular	Casual	Total	Motor	Other		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*
Mississippi River	103	108	211	61	179	38	4,135
Missouri River	45	30	75	16	67	7	733
Lamine River	3	4	7	----	7	----	----
Osage River	11	8	19	5	19	----	----
Minor tributaries	10	3	13	----	11	2	800
St. Francis River	2	9	11	----	10	----	----
White River	2	4	6	1	6	----	----
Current River	1	----	1	----	1	----	----
Lake Taneycomo	----	4	4	1	4	----	----
Total	177	170	347	84	304	47	5,668

Waters	Anchor gill nets		Trammel nets		Trot lines		Fyke nets	Tongs
	Number	*Square yards*	*Number*	*Square yards*	*Number*	*Hooks*	*Number*	*Number*
Mississippi River	1	160	45	3,155	384	23,180	1,293	----
Missouri River	----	----	43	8,613	20	1,875	330	----
Lamine River	----	----	----	----	42	5,875	----	----
Osage River	----	----	4	800	27	870	229	----
Minor tributaries	----	----	12	2,100	----	----	----	----
St. Francis River	----	----	----	----	9	550	20	9
White River	----	----	----	----	20	1,125	----	----
Current River	----	----	----	----	4	200	----	----
Lake Taneycomo	----	----	----	----	10	925	----	----
Total	1	160	104	14,668	516	34,600	1,872	9

CATCH: By gear and waters

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River	17,000	$520	39,319	$3,210	98,311	$5,722	3,670	$522
Missouri River	----	----	2,300	231	12,662	1,257	1,549	297
Minor tributaries	----	----	5,830	583	9,716	777	1,943	350
Total	17,000	520	47,449	4,024	120,689	7,756	7,162	1,169
Anchor gill nets:								
Mississippi River	----	----	425	34	895	63	160	22
Trammel nets:								
Mississippi River	----	----	12,085	1,082	36,663	2,483	4,115	605
Missouri River	----	----	19,454	1,932	60,656	6,018	6,546	1,263
Osage River	----	----	1,638	164	833	84	703	141
Minor tributaries	----	----	13,542	1,355	37,819	3,301	2,896	650
Total	----	----	46,719	4,533	135,971	11,886	14,260	2,659
Trot lines:								
Mississippi River	----	----	9,579	758	4,300	240	32,940	4,625
Missouri River	----	----	430	43	----	----	1,510	302
Lamine River	----	----	1,691	170	3,129	313	347	52
Osage River	----	----	325	33	----	----	1,130	226
St. Francis River	----	----	40	4	300	15	2,000	300
White River	----	----	200	40	175	28	5,292	1,323
Current River	----	----	----	----	----	----	615	123
Lake Taneycomo	----	----	----	----	----	----	2,275	569
Total	----	----	12,265	1,048	7,904	596	46,109	7,520

Fisheries of Missouri, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Bowfin		Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fyke nets:								
Mississippi River			50,732	$4,631	124,836	$8,880	12,068	$1,876
Missouri River			14,411	1,422	34,796	3,416	5,797	1,089
Osage River			6,175	640	6,476	648	5,424	1,085
St. Francis River			815	82	1,550	111	450	67
Total			72,133	6,775	167,658	13,055	23,739	4,117
Total by waters:								
Mississippi River	17,000	$520	112,140	9,715	265,005	17,388	52,953	7,650
Missouri River			36,595	3,628	108,114	10,691	15,402	2,951
Lamine River			1,691	170	3,129	313	347	52
Osage River			8,138	837	7,309	732	7,257	1,452
Minor tributaries			19,372	1,938	47,535	4,078	4,839	1,000
St. Francis River			855	86	1,850	126	2,450	367
White River			200	40	175	28	5,292	1,323
Current River							615	123
Lake Taneycomo							2,275	569
Total	17,000	520	178,991	16,414	433,117	33,356	91,430	15,487

Gear and waters	Eels		Minnows		Paddlefish or spoonbill cat		Quillback or "American carp"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River					25,103	$1,747	1,570	$86
Missouri River			525	$209				
Total			525	209	25,103	1,747	1,570	86
Anchor gill nets: Mississippi River							355	18
Trammel nets: Mississippi River							918	46
Trot lines:								
Mississippi River	1,055	$53			11,160	790		
Missouri River					715	72		
Lamine River					2,000	210		
Total	1,055	53			13,875	1,072		
Fyke nets:								
Mississippi River					1,125	98	10,629	776
Missouri River							200	20
Total					1,125	98	10,829	796
Total by waters:								
Mississippi River	1,055	53			37,388	2,635	13,472	926
Missouri River			525	209	715	72	200	20
Lamine River					2,000	210		
Total	1,055	53	525	209	40,103	2,917	13,672	946

Gear and waters	Sheepshead		Sturgeon, shovel-nose		Sucker "mullet"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River	4,192	$335	7,500	$731		
Missouri River	144	14	450	45		
Total	4,336	349	7,950	776		
Anchor gill nets: Mississippi River	210	17				
Trammel nets:						
Mississippi River	7,042	643	1,193	143		
Missouri River	3,131	315	2,593	277		
Osage River	441	46				
Minor tributaries	200	20				
Total	10,814	1,024	3,786	420		

Fisheries of Missouri, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Sheepshead		Sturgeon, shovelnose		Sucker "mullet"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trot lines:						
Mississippi River			515	$33		
White River	540	$102			200	$40
Total	540	102	515	33	200	40
Fyke nets:						
Mississippi River	15,401	1,351	5,031	474		
Missouri River	1,219	124				
Osage River	5,441	783			1,975	247
St. Francis River	225	23			100	5
Total	22,286	2,281	5,031	474	2,075	252
Total by waters:						
Mississippi River	26,845	2,346	14,239	1,381		
Missouri River	4,494	453	3,043	322		
Osage River	5,882	829			1,975	247
Minor tributaries	200	20				
St. Francis River	225	23			100	5
White River	540	102			200	40
Total	38,186	3,773	17,282	1,703	2,275	292

Gear and waters	Mussel shells		Slugs	Total	
	Pounds	*Value*	*Value*	*Pounds*	*Value*
Haul seines:					
Mississippi River				196,665	$12,873
Missouri River				17,630	2,053
Minor tributaries				17,489	1,710
Total				231,784	16,636
Anchor gill nets: Mississippi River				2,045	154
Trammel nets:					
Mississippi River				62,016	5,002
Missouri River				92,380	9,805
Osage River				3,615	435
Minor tributaries				54,457	5,326
Total				212,468	20,568
Trot lines:					
Mississippi River				59,549	6,499
Missouri River				2,655	417
Lamine River				7,167	745
Osage River				1,455	259
St. Francis River				2,340	319
White River				6,407	1,533
Current River				615	123
Lake Taneycomo				2,275	569
Total				82,463	10,464
Fyke nets:					
Mississippi River				219,822	18,086
Missouri River				56,423	6,071
Osage River				25,491	3,403
St. Francis River				3,140	288
Total				304,876	27,848
Tongs: Mississippi River: St. Francis River	22,000	$275	$18	22,000	293
By hand: Mississippi River	72,000	918	100	72,000	1,018
Total by waters:					
Mississippi River	72,000	918	100	612,097	43,632
Missouri River				169,088	18,346
Lamine River				7,167	745
Osage River				30,561	4,097
Minor tributaries				71,946	7,036
St. Francis River	22,000	275	18	27,480	900
White River				6,407	1,533
Current River				615	123
Lake Taneycomo				2,275	569
Total	94,000	1,193	118	927,636	76,981

NEBRASKA

Fisheries of Nebraska, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Fyke nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*
On boats and shore, casual	36	176	97	299
Boats:				
Motor	8	24	9	30
Other	12	115	76	187
Apparatus:				
Number	12	115	296	
Length, yards	906			
Square yards		4,833		

OPERATING UNITS: BY WATERS

Waters	Fishermen, casual	Boats		Haul seines		Trammel nets		Fyke nets
		Motor	Other					
	Number	*Number*	*Number*	*Number*	*Length, yards*	*Number*	*Square yards*	*Number*
Mississippi River: Missouri River	299	30	187	12	906	115	4,833	296

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Fyke nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Buffalofish	9,060	$906	7,564	$756	1,480	$151	18,104	$1,813
Carp	12,684	1,270	71,971	7,198	8,377	837	93,032	9,305
Catfish and bullheads	2,919	446	26,031	3,906	5,224	783	34,174	5,135
Total	24,663	2,622	105,566	11,860	15,081	1,771	145,310	16,253

NOTE.—The catch in Nebraska was confined to the Missouri River.

OHIO

Fisheries of Ohio, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Trot lines	Fyke nets	By hand	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore, casual	4	14	17	22	49
Boats, other than motor	4	14	17	22	49
Apparatus:					
Number	2	19	76		
Length, yards	180				
Hooks		900			

Fisheries of Ohio, 1931—Continued

OPERATING UNITS: By waters

Waters	Fishermen, casual	Boats, other than motor	Haul seines		Trot lines		Fyke nets
	Number	*Number*	*Number*	*Length, yards*	*Number*	*Hooks*	*Number*
Mississippi River: Ohio River	27	27	2	180	19	900	76
Muskingum River	6	6					
Tuscarawas River	6	6					
Walhonding River	7	7					
Mohican River	3	3					
Total	49	49	2	180	19	900	76

CATCH: By gear and waters

Gear and waters	Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River: Ohio River	100	$10	2,000	$200	110	$22
Trot lines: Mississippi River: Ohio River			150	18	2,115	403
Fyke nets: Mississippi River: Ohio River	6,333	652	12,220	1,325	2,155	386
Total by waters: Mississippi River: Ohio River	6,433	662	14,370	1,543	4,380	811

Gear and waters	Quillback or "American carp"		Sheepshead		Sturgeon, shovelnose		Sucker "mullet"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River: Ohio River			100	$15			150	$15
Trot lines: Mississippi River: Ohio River			140	26	100	$15		
Fyke nets: Mississippi River: Ohio River	1,195	$119	1,078	183	458	57	2,752	253
Total by waters: Mississippi River: Ohio River	1,195	119	1,318	224	558	72	2,902	268

Gear and waters	Yellow pike		Mussel shells		Slugs	Total	
	Pounds	*Value*	*Pounds*	*Value*	*Value*	*Pounds*	*Value*
Haul seines: Mississippi River: Ohio River						2,460	$262
Trot lines: Mississippi River: Ohio River						2,505	462
Fyke nets: Mississippi River: Ohio River	325	$60				26,516	3,035
By hand: Mississippi River: Ohio River: Muskingum River			14,000	$280	$28	14,000	308
Tuscarawas River			30,000	525	60	30,000	585
Walhonding River			92,000	1,840	184	92,000	2,024
Mohican River			18,000	360	36	18,000	396
Total			154,000	3,005	308	154,000	3,313
Total by waters: Mississippi River: Ohio River	325	60				31,481	3,759
Muskingum River			14,000	280	28	14,000	308
Tuscarawas River			30,000	525	60	30,000	585
Walhonding River			92,000	1,840	184	92,000	2,024
Mohican River			18,000	360	36	18,000	396
Total	325	60	154,000	3,005	308	185,481	7,072

OKLAHOMA

Fisheries of Oklahoma, 1931

OPERATING UNITS: By gear

Item	Haul seines	Anchor gill nets	Trot lines	Fyke nets	Total, exclusive of duplication
Fishermen:					
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*
Regular		2	1	4	5
Casual	4	1	13	13	19
Total	4	3	14	17	24
Boats:					
Other than motor	2	2	11	13	18
Apparatus:					
Number	2	3	29	85	
Length, yards	60				
Square yards		990			
Hooks			1,075		

OPERATING UNITS: By waters

Waters	Fishermen			Boats other than motor
	Regular	Casual	Total	
	Number	*Number*	*Number*	*Number*
Mississippi River:				
Arkansas River	3	4	7	5
Canadian River:				
Gaines Creek	2	3	5	3
North Canadian River		3	3	3
Deep Fork River		1	1	1
Red River		3	3	2
Minor tributaries		5	5	4
Total	5	19	24	18

Waters	Haul seines		Anchor gill nets		Trot lines		Fyke nets
	Number	*Length, yards*	*Number*	*Square yards*	*Number*	*Hooks*	*Number*
Mississippi River:							
Arkansas River					3	100	35
Canadian River:							
Gaines Creek	1	50	3	990	6	165	10
North Canadian River					6	240	18
Deep Fork River					2	60	2
Red River							15
Minor tributaries	1	10			12	510	5
Total	2	60	3	990	29	1,075	85

CATCH: By gear and waters

Gear and waters	Buffalofish		Carp		Catfish and bullheads		Paddlefish or spoonbill cat	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River:								
Arkansas River:								
Canadian River: Gaines Creek	300	$30	75	$7	200	$20	300	$30
Red River: Minor tributaries	500	50						
Total	800	80	75	7	200	20	300	30
Anchor gill nets:								
Mississippi River: Arkansas River: Canadian River: Gaines Creek	1,500	150					2,100	210
Trot lines:								
Mississippi River:								
Arkansas River					85	12		
Canadian River:								
Gaines Creek	125	13	75	7	200	20	150	15
North Canadian River	180	18	153	15	30	3		
Deep Fork River			50	5				
Red River: Minor tributaries	400	40	125	12	240	33	150	15
Total	705	71	403	39	555	68	300	30

Fisheries of Oklahoma, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Buffalofish		Carp		Catfish and bullheads		Paddlefish or spoonbill cat	
Fyke nets:								
Mississippi River:								
Arkansas River	*Pounds* 9,000	*Value* $876	*Pounds* 600	*Value* $60	*Pounds* 3,800	*Value* $565	*Pounds* 32	*Value* $3
Canadian River:								
Gaines Creek	3,000	300	1,000	100			2,600	260
North Canadian River	5,300	530	1,300	130	300	30		
Deep Fork River	100	10	300	30				
Red River	700	75	140	14	30	5		
Minor tributaries	500	50	450	45	50	7		
Total	18,600	1,841	3,790	379	4,180	607	2,632	263
Total by waters:								
Mississippi River:								
Arkansas River	9,000	876	600	60	3,885	577	32	3
Canadian River:								
Gaines Creek	4,925	493	1,150	114	400	40	5,150	515
North Canadian River	5,480	548	1,453	145	330	33		
Deep Fork River	100	10	350	35				
Red River	700	75	140	14	30	5		
Minor tributaries	1,400	140	575	57	290	40	150	15
Total	21,605	2,142	4,268	425	4,935	695	5,332	533

Gear and waters	Quillback or "American carp"		Sheepshead		Total	
Haul seines:						
Mississippi River:						
Arkansas River:						
Canadian River: Gaines Creek	*Pounds* 200	*Value* $20	*Pounds* 100	*Value* $10	*Pounds* 1,175	*Value* $117
Red River: Minor tributaries					500	50
Total	200	20	100	10	1,675	167
Anchor gill nets:						
Mississippi River: Arkansas River: Canadian River: Gaines Creek					3,600	360
Trot lines:						
Mississippi River:						
Arkansas River			50	5	135	17
Canadian River:						
Gaines Creek	100	10	150	15	800	80
North Canadian River			105	10	468	46
Deep Fork River					50	5
Red River: Minor tributaries	100	10	75	8	1,090	118
Total	200	20	380	38	2,543	266
Fyke nets:						
Mississippi River:						
Arkansas River	350	35	300	28	14,082	1,567
Canadian River:						
Gaines Creek	1,000	100	500	50	8,100	810
North Canadian River	200	20	200	20	7,300	730
Deep Fork River			15	2	415	42
Red River			55	7	925	101
Minor tributaries					1,000	102
Total	1,550	155	1,070	107	31,822	3,352
Total by waters:						
Mississippi River:						
Arkansas River	350	35	350	33	14,217	1,584
Canadian River:						
Gaines Creek	1,300	130	750	75	13,675	1,367
North Canadian River	200	20	305	30	7,768	776
Deep Fork River			15	2	465	47
Red River			55	7	925	101
Minor tributaries	100	10	75	8	2,590	270
Total	1,950	195	1,550	155	39,640	4,145

SOUTH DAKOTA

Fisheries of South Dakota, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Trot lines	Fyke nets	Total exclusive of duplication
	Number	*Number*	*Number*	*Number*
Fishermen:				
On boats and shore, casual	44	9	20	67
Boats:				
Motor	2			2
Other	11	9	20	34
Apparatus:				
Number	11	18	68	
Length, yards	1,948			
Hooks		3,600		

OPERATING UNITS: BY WATERS

Waters	Fishermen, casual	Boats		Haul seines		Trot lines		Fyke nets
		Motor	Other					
	Number	*Number*	*Number*	*Number*	*Length, yards*	*Number*	*Hooks*	*Number*
Mississippi River:								
Missouri River	23		23			18	3,600	68
James River	44	2	11	11	1,948			
Total	67	2	34	11	1,948	18	3,600	68

CATCH: BY GEAR AND WATERS

Gear and waters	Buffalofish		Carp		Catfish and bullheads	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River: Missouri River: James River	37,876	$3,789	50,036	$2,502		
Trot lines:						
Mississippi River: Missouri River	350	35	1,400	70	2,300	$276
Fyke nets:						
Mississippi River: Missouri River	700	70	1,400	70	11,200	3,252
Total by waters:						
Mississippi River:						
Missouri River	1,050	105	2,800	140	13,500	3,528
James River	37,876	3,789	50,036	2,502		
Total	38,926	3,894	52,836	2,642	13,500	3,528

Gear and waters	Crappie		Paddlefish or spoonbill cat		Quillback or "American carp"	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River: Missouri River: James River	1,392	$70			4,364	$220
Trot lines:						
Mississippi River: Missouri River			400	$40		
Total by waters:						
Mississippi River:						
Missouri River			400	40		
James River	1,392	70			4,364	220
Total	1,392	70	400	40	4,364	220

Fisheries of South Dakota, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Sheepshead		Sucker "mullet"		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River: Missouri River: James River	697	$70	2,246	$112	96,611	$6,763
Trot lines:						
Mississippi River: Missouri River					4,450	421
Fyke nets:						
Mississippi River: Missouri River					13,300	3,392
Total by waters:						
Mississippi River:						
Missouri River					17,750	3,813
James River	697	70	2,246	112	96,611	6,763
Total	697	70	2,246	112	114,361	10,576

TENNESSEE

Fisheries of Tennessee, 1931

OPERATING UNITS: BY GEAR

Item	Trammel nets	Hand lines	Trot lines	Fyke nets	Spears	Crowfoot bars	Total, exclusive of duplication
Fishermen:							
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	50	67	159	159		45	327
Casual	3		104	68	12	70	206
Total	53	67	263	227	12	115	533
Boats:							
Motor			6	94		42	138
Other	52	67	252	217	12	73	467
Apparatus:							
Number	52	67	464	1,735	12	230	
Square yards	3,560						
Hooks		67	41,690				

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Trammel nets	
	Regular	Casual	Total	Motor	Other		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Square yards*
Mississippi River	60	5	65	33	61		
Hatchie River	17	6	23	2	21	6	410
Obion River	74	3	77	24	77		
Reelfoot Lake	90	16	106	30	102	46	3,150
Ohio River:							
Cumberland River	18	59	77	5	69		
Tennessee River	68	111	179	44	132		
Clinch River		6	6		5		
Total	327	206	533	138	467	52	3,560

Waters	Hand lines		Trot lines		Fyke nets	Spears	Crowfoot bars
	Number	*Hooks*	*Number*	*Hooks*	*Number*	*Number*	*Number*
Mississippi River			56	5,000	556		
Hatchie River			28	2,800	24		
Obion River			104	7,300	387		
Reelfoot Lake	67	67	80	8,000	465	12	
Ohio River:							
Cumberland River			114	10,230	143		
Tennessee River			74	7,900	160		230
Clinch River			8	460			
Total	67	67	464	41,690	1,735	12	230

Fisheries of Tennessee, 1931—Continued

CATCH: BY GEAR AND WATERS

Gear and waters	Black bass		Buffalofish		Carp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trammel nets:						
Mississippi River:						
Hatchie River			3,400	$238	3,700	$180
Obion River: Reelfoot Lake			59,900	4,124	19,550	587
Total			63,300	4,362	23,250	767
Hand lines:						
Mississippi River: Obion River: Reelfoot Lake	14,000	$1,680				
Trot lines:						
Mississippi River			4,750	293	7,420	221
Hatchie River			1,175	83	3,200	122
Obion River			6,560	473	5,000	185
Reelfoot Lake			6,650	466	1,000	31
Ohio River:						
Cumberland River			481	70	1,244	146
Tennessee River			6,665	823	1,331	150
Total			26,281	2,208	19,195	855
Fyke nets:						
Mississippi River			114,000	7,920	80,200	2,662
Hatchie River			11,400	791	8,900	304
Obion River			84,300	5,926	68,120	2,557
Reelfoot Lake			172,200	12,053	37,300	1,119
Ohio River:						
Cumberland River			3,685	561	7,321	856
Tennessee River			3,426	426	3,555	474
Total			389,011	27,677	205,396	7,972
Total by waters:						
Mississippi River			118,750	8,213	87,620	2,883
Hatchie River			15,975	1,112	15,800	606
Obion River			90,860	6,399	73,120	2,742
Reelfoot Lake	14,000	1,680	238,750	16,643	57,850	1,737
Ohio River:						
Cumberland River			4,166	631	8,565	1,002
Tennessee River			10,091	1,249	4,886	624
Total	14,000	1,680	478,592	34,247	247,841	9,594

Gear and waters	Catfish and bullheads		Crappie		Eels		Paddlefish or spoonbill cat	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trammel nets:								
Mississippi River:								
Hatchie River	4,500	$338					450	$14
Obion River: Reelfoot Lake	13,450	1,076	6,650	$499				
Total	17,950	1,414	6,650	499			450	14
Trot lines:								
Mississippi River	23,750	1,875					1,250	44
Hatchie River	8,600	653					50	2
Obion River	53,020	4,226					825	29
Reelfoot Lake	89,500	7,160	1,050	79				
Ohio River:								
Cumberland River	13,740	2,073			95	$16	37	4
Tennessee River	17,685	2,572			68	9	30	3
Clinch River	480	96						
Total	206,775	18,655	1,050	79	163	25	2,192	82
Fyke nets:								
Mississippi River	20,490	1,531					520	22
Hatchie River	2,500	200					350	14
Obion River	6,025	479					100	5
Reelfoot Lake	5,000	400	8,900	660				
Ohio River:								
Cumberland River	5,955	1,039	2,052	420			600	64
Tennessee River	7,058	1,032					822	100
Total	47,028	4,681	10,952	1,080			2,392	205
Total by waters:								
Mississippi River	44,240	3,406					1,770	66
Hatchie River	15,600	1,191					850	30
Obion River	59,045	4,705					925	34
Reelfoot Lake	107,950	8,636	16,600	1,238				
Ohio River:								
Cumberland River	19,695	3,112	2,052	420	95	16	637	93
Tennessee River	24,743	3,604			68	9	852	103
Clinch River	480	96						
Total	271,753	24,750	18,652	1,658	163	25	5,034	301

Fisheries of Tennessee, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Quillback or "American carp"		Sheepshead		Sturgeon, shovelnose	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trammel nets:						
Mississippi River:						
Hatchie River			1,500	$60		
Obion River: Reelfoot Lake			17,900	358		
Total			19,400	418		
Trot lines:						
Mississippi River			900	36		
Obion River			5,050	202		
Reelfoot Lake			4,050	81		
Ohio River:						
Cumberland River	55	$8	10,640	1,711		
Tennessee River	2,000	249	6,654	853	300	$15
Clinch River			140	28		
Total	2,055	257	27,434	2,911	300	15
Fyke nets:						
Mississippi River			25,100	969		
Hatchie River			2,350	94		
Obion River			35,250	1,403		
Reelfoot Lake			67,500	1,350		
Ohio River:						
Cumberland River	1,560	228	11,775	1,760	2,815	302
Tennessee River	2,450	358	8,861	1,560	591	76
Total	4,010	586	150,836	7,136	3,406	378
Total by waters:						
Mississippi River			26,000	1,005		
Hatchie River			3,850	154		
Obion River			40,300	1,605		
Reelfoot Lake			89,450	1,789		
Ohio River:						
Cumberland River	1,615	236	22,415	3,471	2,815	302
Tennessee River	4,450	607	15,515	2,413	891	91
Clinch River			140	28		
Total	6,065	843	197,670	10,465	3,706	393

Gear and waters	Sucker "mullet"		Sunfish		White bass		Mussel shells	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trammel nets:								
Mississippi River:								
Obion River: Reelfoot Lake			3,750	$189	750	$38		
Trot lines:								
Mississippi River: Obion River: Reelfoot Lake			800	40				
Fyke nets:								
Mississippi River	150	$5						
Obion River	250	8						
Reelfoot Lake			17,300	865	1,350	68		
Ohio River:								
Cumberland River	4,915	663						
Tennessee River	3,008	443						
Total	8,323	1,119	17,300	865	1,350	68		
Crowfoot bars:								
Mississippi River: Ohio River: Tennessee River							2,157,000	$15,604
Total by waters:								
Mississippi River	150	5						
Obion River	250	8						
Reelfoot Lake			21,850	1,094	2,100	106		
Ohio River:								
Cumberland River	4,915	663						
Tennessee River	3,008	443					2,157,000	15,604
Total	8,323	1,119	21,850	1,094	2,100	106	2,157,000	15,604

Fisheries of Tennessee, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Pearls	Slugs	Frogs		Terrapin		Total	
	Value	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Trammel nets:								
Mississippi River:								
Hatchie River							13,550	$830
Obion River: Reelfoot Lake							121,950	6,871
Total							135,500	7,701
Hand lines:								
Mississippi River: Obion River: Reelfoot Lake							14,000	1,680
Trot lines:								
Mississippi River							38,070	2,469
Hatchie River							13,025	860
Obion River							70,455	5,115
Reelfoot Lake							103,050	7,857
Ohio River:								
Cumberland River					70	$14	26,362	4,042
Tennessee River							34,733	4,674
Clinch River							620	124
Total					70	14	286,315	25,141
Fyke nets:								
Mississippi River							240,460	13,109
Hatchie River							25,500	1,403
Obion River							194,045	10,378
Reelfoot Lake							309,550	16,515
Ohio River:								
Cumberland River							40,678	5,893
Tennessee River							29,771	4,469
Total							840,004	51,767
Spears:								
Mississippi River: Obion River: Reelfoot Lake			2,250	$270			2,250	270
Crowfoot bars:								
Mississippi River: Ohio River: Tennessee River	$28	$1,724					2,157,000	17,356
Total by waters:								
Mississippi River							278,530	15,578
Hatchie River							52,075	3,093
Obion River							264,500	15,493
Reelfoot Lake			2,250	270			550,800	33,193
Ohio River:								
Cumberland River					70	14	67,040	9,935
Tennessee River	28	1,724					2,221,504	26,499
Clinch River							620	124
Total	28	1,724	2,250	270	70	14	3,435,069	103,915

TEXAS

Fisheries of Texas, 1931

OPERATING UNITS: BY GEAR

Item	Trot lines	Fyke nets	Total, exclusive of duplication
Fishermen:			
On boats and shore:	*Number*	*Number*	*Number*
Regular	5	5	5
Casual	41	26	41
Total	46	31	46
Boats:			
Motor	6	6	6
Other	39	29	42
Apparatus:			
Number	80	70	----
Hooks	14,500	----	----

Fisheries of Texas, 1931—Continued

OPERATING UNITS: By waters

Waters	Fishermen			Boats		Trot lines		Fyke nets
	Regular	Casual	Total	Motor	Other			
Mississippi River: Red River:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Hooks*	*Number*
Caddo Lake	2	18	20	3	19	35	7,000	30
Sulphur River	3	23	26	3	23	45	7,500	40
Total	5	41	46	6	42	80	14,500	70

CATCH: By gear and waters

Gear and waters	Buffalofish		Carp		Catfish and bullheads	
Trot lines:						
Mississippi River:						
Red River:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Caddo Lake			2,000	$40	20,000	$1,600
Sulphur River			1,900	38	24,000	1,920
Total			3,900	78	44,000	3,520
Fyke nets:						
Mississippi River:						
Red River:						
Caddo Lake	35,000	$1,050	2,000	40	2,000	160
Sulphur River	38,000	1,140	1,000	20	1,800	144
Total	73,000	2,190	3,000	60	3,800	304
Total by waters:						
Mississippi River:						
Red River:						
Caddo Lake	35,000	1,050	4,000	80	22,000	1,760
Sulphur Lake	38,000	1,140	2,900	58	25,800	2,064
Total	73,000	2,190	6,900	138	47,800	3,824

Gear and waters	Quillback or "American carp"		Sheepshead		Total	
Trot lines:						
Mississippi River:						
Red River:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Caddo Lake			2,500	$50	24,500	$1,690
Sulphur River			3,000	60	28,900	2,018
Total			5,500	110	53,400	3,708
Fyke nets:						
Mississippi River:						
Red River:						
Caddo Lake	500	$10	2,000	40	41,500	1,300
Sulphur River			2,800	56	43,600	1,360
Total	500	10	4,800	96	85,100	2,660
Total by waters:						
Mississippi River:						
Red River:						
Caddo Lake	500	10	4,500	90	66,000	2,990
Sulphur Lake			5,800	116	72,500	3,378
Total	500	10	10,300	206	138,500	6,368

WISCONSIN

Fisheries of Wisconsin, 1931

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trot lines	Pound nets	Fyke nets	Crow-foot bars	By hand	Total, exclusive of duplication
Fishermen:								
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	132	6	1	32	15	47	40	202
Casual	50	9	1	4		55	2	112
Total	182	15	2	36	15	102	42	314
Boats:								
Motor	76	6		31	11	61		160
Other	78	6	2	31	13	41	42	180
Apparatus:								
Number	83	6	3	345	222	190		
Length, yards	20,149							
Square yards		13,488						
Hooks			125					

OPERATING UNITS: BY WATERS

Waters	Fishermen			Boats		Haul seines	
	Regular	Casual	Total	Motor	Other		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Length, yards*
Mississippi River	198	103	301	154	175	82	19,849
Wisconsin River	4		4	1	1	1	300
Fox River: Wolf River		9	9	5	4		
Total	202	112	314	160	180	83	20,149

Waters	Anchor gill nets		Trot lines		Pound nets	Fyke nets	Crow-foot bars
	Number	*Square yards*	*Number*	*Hooks*	*Number*	*Number*	*Number*
Mississippi River	6	13,488	3	125	345	222	172
Wisconsin River: Fox River: Wolf River							18
Total	6	13,488	3	125	345	222	190

CATCH: BY GEAR AND WATERS

Gear and waters	Bowfin		Buffalofish		Carp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River	248,436	$3,742	157,958	$7,956	670,292	$20,332
Wisconsin River			33,000	1,650	7,000	265
Total	248,436	3,742	190,958	9,606	677,292	20,597
Anchor gill nets: Mississippi River			13,430	741	18,838	496
Pound nets: Mississippi River	20,284	319	31,048	1,553	53,304	1,798
Fyke nets: Mississippi River	19,450	294	32,565	1,628	28,040	909
Total, by waters:						
Mississippi River	288,170	4,355	235,001	11,878	770,474	23,535
Wisconsin River			33,000	1,650	7,000	265
Total	288,170	4,355	268,001	13,528	777,474	23,800

Fisheries of Wisconsin, 1931—Continued

CATCH: BY GEAR AND WATERS—Continued

Gear and waters	Catfish and bullheads		Quillback or "American carp"		Sheepshead	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Haul seines:						
Mississippi River	41,017	$3,538	45,930	$1,369	49,518	$2,245
Wisconsin River			10,000	350		
Total	41,017	3,538	55,930	1,719	49,518	2,245
Trot lines: Mississippi River	950	110			250	12
Pound nets: Mississippi River	15,747	1,507	10,423	313	23,651	980
Fyke nets: Mississippi River	7,825	670			10,990	455
Total, by waters:						
Mississippi River	65,539	5,825	56,353	1,682	84,409	3,692
Wisconsin River			10,000	350		
Total	65,539	5,825	66,353	2,032	84,409	3,692

Gear and waters	Sucker "mullet"		Mussel shells		Pearls	Slugs	Total	
	Pounds	*Value*	*Pounds*	*Value*	*Value*	*Value*	*Pounds*	*Value*
Haul seines:								
Mississippi River	109,036	$3,267					1,322,187	$42,449
Wisconsin River							50,000	2,265
Total	109,036	3,267					1,372,187	44,714
Anchor gill nets: Mississippi River							32,268	1,237
Trot lines: Mississippi River							1,200	122
Pound nets: Mississippi River	25,498	385					179,955	6,855
Fyke nets: Mississippi River	1,450	44					100,320	4,000
Crowfoot bars:								
Mississippi River			786,500	$7,763	$460	$1,546	786,500	9,769
Wisconsin River: Fox River: Wolf River			22,500	281	20	71	22,500	372
Total			809,000	8,044	480	1,617	809,000	10,141
By hand: Mississippi River			150,200	902	75	395	150,200	1,372
Total, by waters:								
Mississippi River	135,984	3,696	936,700	8,665	535	1,941	2,572,630	65,804
Wisconsin River							50,000	2,265
Fox River: Wolf River			22,500	281	20	71	22,500	372
Total	135,984	3,696	959,200	8,946	555	2,012	2,645,130	68,441

Industries related to the fisheries of the Mississippi River and tributaries, 1931

OPERATING UNITS, SALARIES, AND WAGES

Item	Arkansas	Illinois	Indiana	Iowa	Kentucky	Louisiana	Minnesota and North Dakota
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Transporting:							
Persons engaged	13				11	5	
Vessels, motor	4				2	2	
Net tonnage	69				15	20	
Wholesale and manufacturing:							
Establishments	6	38	4	61	11	22	13
Persons engaged:							
Proprietors	3	42	1	52	8	24	11
Salaried employees	9	3	5	79	20	14	27
Wage earners:							
Average for season	152	331	140	2,500	261	70	112
Average for year	72	235	93	2,179	159	68	112
Paid to salaried employees	$11,417	$9,520	$6,820	$141,346	$33,159	$12,400	$55,200
Paid to wage earners	53,503	145,683	51,444	1,417,678	81,643	37,700	81,500
Total salaries and wages	64,920	155,203	58,264	1,559,024	114,802	50,100	136,700
Fishermen manufacturing		4	2			200	

Industries related to the fisheries of the Mississippi River and tributaries, 1931—Continued

OPERATING UNITS, SALARIES, AND WAGES—Continued

Item	Mississippi	Missouri and Oklahoma	Nebraska and Kansas	Ohio and Pennsylvania	Tennessee	Wisconsin	Total
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged							29
Vessels, motor							8
Net tonnage							104
Wholesale and manufacturing:							
Establishments	6	21	3	13	11	8	217
Persons engaged:							
Proprietors	7	24	3	17	9	3	204
Salaried employees	3	125	8	37	15	10	355
Wage earners:							
Average for season	26	328	52	175	90	38	4,275
Average for year	26	261	52	145	52	29	3,483
Paid to salaried employees	$16,000	$291,874	$17,400	$95,878	$34,884	$12,998	$738,896
Paid to wage earners	22,382	202,944	45,580	138,817	38,177	24,483	2,341,534
Total salaries and wages	38,382	494,818	62,980	234,695	73,061	37,481	3,080,430
Fishermen manufacturing	7	3					216

PRODUCTS MANUFACTURED

Item	Arkansas		Illinois		Indiana	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Mussel-shell products:						
Buttons, gross			(1)	(1)	(1)	(1)
Button blanks, do	503,548	$87,752	(1)	(1)	(1)	(1)
Poultry feed, tons			(1)	(1)	(1)	(1)
Unclassified				[2] $235,814		[3] $115,866
Total		87,752		235,814		115,866
By fishermen:						
Carp, smoked, pounds			667	67		
Paddlefish roe, salted, do					450	180
Sheepshead, smoked, do			617	77		
Sturgeon:						
Smoked, do			1,333	400		
Roe, salted, do			35	32		
Total				576		180
Grand total		87,752		236,390		116,046

Item	Iowa		Kentucky		Louisiana	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Salmon, smoked, pounds	240,000	$48,800				
Sturgeon, smoked, do	162,000	39,140				
Tullibees, smoked, do	58,000	11,440				
Mussel-shell products:						
Buttons, gross	12,121,024	3,399,952				
Button blanks, do	8,590,598	1,424,618	(1)	(1)		
Cut shells, tons	22,239	42,749	(1)	(1)		
Lime, do	2,291	2,291				
Poultry feed, do	11,288	89,503	(1)	(1)		
Unclassified				[4] $155,182		
Unclassified, miscellaneous		[5] 152,092				
Total		5,210,585		155,182		
By fishermen:						
Alligator hides, pounds					88,356	$7,363
Grand total		5,210,585		155,182		7,363

[1] The production of this item is included under unclassified products.
[2] Includes the production of buttons, button blanks, and poultry feed.
[3] Includes the production of button blanks, and a small quantity of poultry feed and stucco.
[4] Includes the production of button blanks, cut shells, and poultry feed.
[5] Includes the production of smoked buffalofish, and mussel-shell novelties, bird shell sugar, dyed chips, polished chips, and stucco.

Industries related to the fisheries of the Mississippi River and tributaries, 1931—Continued

PRODUCTS MANUFACTURED—Continued

Item	Minnesota, Nebraska, Kansas, and Wisconsin		Mississippi		Missouri		Ohio and Pennsylvania	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Salmon, smoked—pounds							(1)	(1)
Sturgeon, smoked—do	(1)	(1)						
Tullibees, smoked—do							(1)	(1)
Whitefish, smoked—do	255,000	$47,200					(1)	(1)
Mussel-shell products:								
Buttons—gross	(1)	(1)			(1)	(1)		
Button blanks—do	(1)	(1)			(1)	(1)	(1)	(1)
Cut shells—tons	(1)	(1)					(1)	(1)
Lime—do	(1)	(1)			(1)	(1)		
Poultry feed—do	252	1,875			(1)	(1)		
Unclassified								
Unclassified, miscellaneous		[7] 230,218				[6]$141,697		[8]$131,433
Total		279,293				141,697		131,433
By fishermen:								
Paddlefish roe, salted—pounds			245	$92	900	540		
Grand total		279,293		92		142,237		131,433

[1] The production of this item is included under unclassified products.
[6] Includes the production of buttons, button blanks, lime, and poultry feed.
[7] Includes the production of smoked eels, salmon, and sturgeon, and buttons, button blanks, cut shell, and novelties.
[8] Includes the production of smoked buffalofish, butterfish, carp, chubs, lake trout, paddlefish, salmon, tullibees, and whitefish, and button blanks, and cut shells.

NOTE.—The total value of the products in the Mississippi River and tributaries was as follows: By manufacturing establishments, $6,357,622; by fishermen, $8,751. Some of the above products may have been manufactured from fishery products imported from another section of the United States or foreign countries; therefore, they cannot be correlated directly with the catch within the section. None of the persons engaged on transporting vessels has been included as fishermen; and of the total number of persons engaged in the preparation of fishermen's manufactured products, 16 have been included as fishermen. These facts should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

LAKE PEPIN

Fisheries of Lake Pepin, 1931

Item	Haul seines		Anchor gill nets		Pound nets		Total, exclusive of duplication	
OPERATING UNITS								
Fishermen:								
On boats and shore:	*Number*		*Number*		*Number*		*Number*	
Regular	33		7		18		44	
Casual	20		10		7		27	
Total	53		17		25		71	
Boats:								
Motor	24		7		18		39	
Other	24		7		18		39	
Apparatus:								
Number	24		7		166			
Length, yards	9,365							
Square yards			13,933					
CATCH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	700	$11			1,764	$40	2,464	$51
Buffalofish	2,367	175	2,599	$199	5,513	276	10,479	650
Carp	274,100	8,744	21,274	746	26,819	842	322,193	10,332
Catfish and bullheads	3,492	403			6,787	814	10,279	1,217
Quillback or "American carp"	4,200	126			10,423	313	14,623	439
Sheepshead	11,503	642			17,886	712	29,389	1,354
Suckers	16,584	497			25,498	385	42,082	882
Total	312,946	10,598	23,873	945	94,690	3,382	431,509	14,925

LAKE KEOKUK

Fisheries of Lake Keokuk, 1931

Item	Haul seines		Trot lines		Fyke nets		Baskets		Total, exclusive of duplication	
OPERATING UNITS										
Fishermen:										
On boats and shore:	*Number*		*Number*		*Number*		*Number*		*Number*	
Regular	21		36		42		24		51	
Casual	20		32		18				38	
Total	41		68		60		24		89	
Boats:										
Motor	19		28		37		12		41	
Other	17		40		34		10		46	
Apparatus:										
Number	18		254		1,359		1,180			
Length, yards	5,482									
Hooks			38,800							
CATCH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	5,125	$149			1,900	$54			7,025	$203
Buffalofish	37,112	2,968			75,253	5,853			112,365	8,821
Carp	105,004	4,179	9,395	$350	55,750	1,914			170,149	6,443
Catfish and bullheads	12,130	1,213	46,060	4,579	12,190	1,207	49,290	$4,722	119,670	11,721
Eels			215	11					215	11
Mooneye	500	10							500	10
Paddlefish	7,100	478							7,100	478
Quillback or "American carp"	6,500	130			2,200	44			8,700	174
Sheepshead	53,300	2,665	3,735	186	15,794	765			72,829	3,616
Sturgeon, shovelnose	300	30							300	30
Sucker "mullet"	3,000	60			1,000	20			4,000	80
Terrapin	3,800	76							3,800	76
Turtles:										
Snapper	2,000	40							2,000	40
Soft-shell	3,000	60							3,000	60
Total	238,871	12,058	59,405	5,126	164,087	9,857	49,290	4,722	511,653	31,763

MISSISSIPPI RIVER BETWEEN LAKE PEPIN AND LAKE KEOKUK

Fisheries of Mississippi River between Lake Pepin and Lake Keokuk, 1931

Item	Haul seines		Anchor gill nets		Trammel nets	
OPERATING UNITS						
Fishermen:						
On boats and shore:	*Number*		*Number*		*Number*	
Regular	241		5		12	
Casual	220		5			
Total	461		10		12	
Boats:						
Motor	184		5		6	
Other	192		5		6	
Apparatus:						
Number	212		5		6	
Length, yards	49,030					
Square yards			6,221		1,000	
CATCH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	329,176	$7,213				
Buffalofish	453,614	29,874	13,321	$667	6,950	$397
Carp	1,255,579	51,708	16,549	523	15,650	470
Catfish and bullheads	109,151	10,426			1,050	105
Eels	325	15				
Paddlefish	2,000	195				
Pickerel	4,700	470				
Quillback or "American carp"	58,709	1,500				
Sheepshead	219,187	11,182	1,045	52	910	45
Sturgeon, shovelnose	15,959	1,583	284	20	1,240	124
Suckers	145,667	4,174	900	27		
Terrapin	13,100	257				
Turtles, soft-shell	14,000	280				
Total	2,621,167	118,877	32,099	1,289	25,800	1,141

Fisheries of Mississippi River between Lake Pepin and Lake Keokuk, 1931—Con.

Item	Trot lines		Pound nets		Fyke nets	
OPERATING UNITS						
Fishermen:						
On boats and shore:	*Number*		*Number*		*Number*	
Regular	110		15		236	
Casual	229				168	
Total	339		15		404	
Boats:						
Motor	166		14		290	
Other	158		14		168	
Apparatus:						
Number	1,116		181		2,698	
Hooks	177,400					
CATCH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin			18,520	$279	19,450	$294
Buffalofish	275	$14	25,535	1,277	457,590	34,845
Carp	60,320	2,970	30,200	1,105	802,606	38,238
Catfish and bullheads	294,352	31,070	8,960	693	79,214	8,713
Eels	50	3				
Paddlefish					3,840	269
Quillback or "American carp"					19,400	427
Sheepshead	38,416	1,958	5,825	271	138,405	7,115
Sturgeon, shovelnose					1,467	187
Suckers	1,325	40			6,141	144
Terrapin					200	4
Total	394,738	36,055	89,040	3,625	1,528,313	90,236

Item	Dip nets		Baskets		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:						
On boats and shore:	*Number*		*Number*		*Number*	
Regular			22		436	
Casual	4		1		439	
Total	4		23		875	
Boats:						
Motor			13		428	
Other					425	
Apparatus:						
Number	4		690			
CATCH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					367,146	$7,786
Buffalofish					957,285	67,074
Carp	1,275	$64			2,182,179	95,078
Catfish and bullheads			77,300	$7,140	570,027	58,147
Eels					375	18
Paddlefish					5,840	464
Pickerel					4,700	470
Quillback or "American carp"					78,109	1,927
Sheepshead	645	53			404,433	20,676
Sturgeon, shovelnose					18,950	1,914
Suckers					154,033	4,385
Terrapin					13,300	261
Turtles, soft-shell					14,000	280
Total	1,920	117	77,300	7,140	4,770,377	258,480

STATISTICAL SURVEY PROCEDURE

For data on the statistical survey procedure generally followed in collecting and compiling the figures given in part 2 of this report and also for a list of common and scientific names of the fishery products mentioned in this report, the reader is referred to "Fishery Industries of the United States, 1931", Appendix II to the Report of the Commissioner of Fisheries for the fiscal year 1932.

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PROPAGATION AND DISTRIBUTION OF FOOD FISHES, FISCAL YEAR, 1933[1]

By GLEN C. LEACH, *Chief, Division of Fish Culture*

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INTRODUCTION

The system of Federal fish hatcheries inaugurated contemporary with the establishment of the United States Fish Commission in 1872 reached its point of greatest expansion and development during the year ending June 30, 1933. New hatcheries and auxiliaries placed in operation, together with enlargements and improvements of facilities at older stations, rendered possible an output exceeded only once previously.

It is indisputably evident that the need which prompted the establishment of Federal hatcheries in 1872 must be emphasized many fold 60 years later. If the artificial replenishment of fish was essential when the country was just emerging from the pioneer era, what must be the demand under conditions of increased poulation, industrialization, improved transportation, and added leisure time? The more intense drain on aquatic life which civilization has imposed has in part been met by fish-cultural activities on the part of a number of the States, by protective legislation, and by the application of biological

[1] Appendix IV to the Report, Commissioner of Fisheries, 1933. Approved for publication, Mar. 3, 1934.

principles to all phases of fisheries conservation. However, many States still accomplish comparatively little in restocking their waters and some of the most important species of fish are essentially migratory by nature, being no respecters of State lines. These facts, together with the requirements for restocking a tremendous area of Federally owned and controlled lands, have brought about a continuation and expansion of fish hatchery work as a function of the central Government. Occasionally it has been suggested that this work be supported by charges levied against those who benefit by the planting of fish rather than by general taxation. The fallacy of this belief lies in the fact that the benefits accruing—the catching of food and game fish—cannot be reserved for those who might directly defray the cost of planting fish in public or open waters. The individual cannot be fairly assessed for the stocking of fish which later on are to fall victim to those who take no interest in maintaining the supply. A system of direct charges for governmental fish-cultural work would eventually result in depletion to the point of extinction of the most valuable food and game varieties.

SPECIES HANDLED

Discontinuance of the propagation of suckers, striped bass, and golden trout reduced the number of species handled to 46. Of these approximately 40 were propagated directly at the hatcheries, the remainder being handled in connection with rescue or salvage activities. While only five species of marine fish were handled, they are propagated in tremendous numbers. The fresh water forms included in the output comprise practically all types which are of importance from either a game or commercial standpoint. Fish from the Bureau's hatcheries were planted in every State in the Union and in the Territory of Alaska. Following is a list of the species handled during the fiscal year 1933.

Catfishes (Siluridæ):
- Catfish (*Leptops olivaris*).
- Spotted catfish (*Ictalurus punctatus*).
- Horned pout (*Ameiurus nebulosus*).

Carp (Cyprinidæ): Common carp (*Cyprinus carpio*).

Shad and Herring (Clupeidæ):
- Shad (*Alosa sapidissima*).
- Glut herring (*Pomolobus aestivalis*).

Salmons, Trouts, and Whitefishes (Salmonidæ):
- Common whitefish (*Coregonus clupeaformis*).
- Cisco (*Leucichthys artedi*).
- Chinook, king, or quinnat salmon (*Oncorhynchus tschawytscha*).
- Chum salmon (*Oncorhynchus keta*).
- Pink or humpback salmon (*Oncorhynchus gorbuscha*).
- Coho salmon, silver salmon (*Oncorhynchus kisutch*).
- Red salmon, sockeye, or blueback salmon (*Oncorhynchus nerka*).
- Steelhead salmon (*Salmo gairdneri*).
- Atlantic salmon (*Salmo salar*).
- Landlocked salmon (*Salmo sebago*).
- Rainbow trout (*Salmo shasta*).
- Black-spotted trout, redthroat trout (*Salmo lewisi*).
- Loch Leven trout (*Salmo levenensis*).
- Lake trout, Mackinaw trout (*Cristivomer namaycush*).
- Brook trout (*Salvelinus fontinalis*).
- Dolly Varden trout (*Salvelinus malma*).

Graylings (Thymallidæ): Montana grayling (*Thymallus montanus*).

Pikes (Esocidæ): Common pickerel (*Esox reticulatus*).

SUNFISHES (CENTRARCHIDÆ):
Crappie (*Pomoxis annularis* and *P. sparoides*).
Largemouth black bass (*Micropterus salmoides*).
Smallmouth black bass (*Micropterus dolomieu*).
Rock bass (*Ambloplites rupestris*).
Warmouth bass, goggle-eye (*Chaenobrytus gulosus*).
Bluegill sunfish (*Lepomis incisor*).
Green sunfish (*Lepomis cyanellus*).
Redbreasted bream (*Lepomis auritus*).
Red-eared sunfish (*Lepomis heros*).
Common sunfish (*Lepomis gibbosus*).
Rio Grande perch (*Herichthys cyanoguttatus*).
PERCHES (PERCIDÆ):
Pike perch (*Stizostedion vitreum*).
Yellow perch, ringed perch (*Perca flavescens*).
WHITE BASSES (SERRANIDÆ):
White bass (*Roccus chrysops*).
White perch (*Morone americana*).
DRUMS (SCIÆNIDÆ): Fresh-water drum, lake sheepshead (*Aplodinotus grunniens*).
CODS (GADIDÆ):
Cod (*Gadus callarias*).
Haddock (*Melanogrammus aeglefinus*).
Pollock (*Polachius virens*).
FLOUNDERS (PLEURONECTIDÆ): Winter flounder, American flatfish.
MACKEREL (SCOMBRIDÆ): Common mackerel (*Scomber scombrus*).

Summary, by species, of the output of fish and fish eggs during fiscal year ended June 30, 1933

Species	Eggs	Fry	Fingerlings	Total
Catfish			29, 417, 300	29, 417, 300
Buffalofish [1]	94, 049, 000		1, 053, 000	95, 102, 000
Carp [1]	23, 500, 000		2, 232, 200	25, 732, 200
Shad		22, 737, 000		22, 737, 000
Glut herring		25, 000, 000		25, 000, 000
Whitefish	500, 000	156, 721, 000		157, 221, 000
Cisco		15, 100, 000		15, 100, 000
Chinook salmon	10, 354, 000	13, 437, 000	34, 491, 000	58, 282, 000
Chum salmon		21, 594, 000		21, 594, 000
Silver salmon	807, 000	2, 004, 000	1, 597, 000	4, 408, 000
Sockeye salmon	3, 011, 000	27, 717, 000	21, 985, 000	52, 713, 000
Humpback salmon	2, 608, 000	154, 000		2, 762, 000
Steelhead salmon	338, 000		1, 563, 000	1, 901, 000
Atlantic salmon	500, 000		474, 600	974, 600
Landlocked salmon	25, 000	8, 000	911, 100	944, 100
Rainbow trout	5, 860, 000	128, 000	8, 558, 300	14, 546, 300
Black-spotted trout	6, 353, 000		14, 122, 700	20, 475, 700
Loch Leven trout	12, 054, 000	2, 436, 000	5, 579, 200	20, 069, 200
Lake trout	840, 000	18, 683, 000	356, 500	19, 879, 500
Brook trout	150, 000	2, 923, 000	15, 454, 400	18, 527, 400
Dolly Varden trout	154, 000			154, 000
Grayling	50, 000	146, 000	25	196, 025
Pike and pickerel			163, 700	163, 700
Mackerel		5, 127, 000		5, 127, 000
Crappie			15, 046, 300	15, 046, 300
Largemouth black bass		1, 125, 000	2, 950, 900	4, 075, 900
Smallmouth black bass		806, 000	357, 200	1, 163, 200
Rock bass			91, 800	91, 800
Warmouth bass			22, 200	22, 200
Sunfish			19, 200, 000	19, 200, 000
Pike perch		127, 775, 000		127, 775, 000
Yellow perch		172, 635, 000	374, 500	173, 009, 500
White perch		3, 350, 000	600	3, 350, 600
White bass			21, 500	21, 500
Rio Grande perch			3, 900	3, 900
Fresh-water drum			15, 000	15, 000
Cod	1, 812, 414, 000	498, 338, 000		2, 310, 752, 000
Haddock	704, 250, 000	29, 533, 000		733, 783, 000
Pollock		13, 861, 000		13, 861, 000
Winter flounder		3, 180, 662, 000		3, 180, 662, 000
Miscellaneous fishes			6, 295, 700	6, 295, 700
Total	2, 677, 817, 000	4, 342, 000, 000	182, 338. 625	7, 202, 155, 625

[1] All carp and buffalofish shown in above table are planted in commercial areas of the Mississippi River.

OUTPUT

The hatchery production and distribution for the fiscal year 1933 was in excess of that of 1932, the increase being approximately 1.8 percent. The total output of eggs, fry, and fish of all sizes was 7,202,155,625. This increase was achieved in spite of the reduction in the appropriation for hatchery operations, and represents a more intensive use of existing facilities, together with expansion and improvement at the older stations and the operation of several new auxiliaries and rearing units. It is especially gratifying that the fish in the category of fingerlings were distributed in greatly increased numbers over the previous year. The output of this larger stock amounted to 182,338,625, an increase over last year of 22.7 percent. The percentage of the various groups represented a considerable change from the previous year. Game fishes accounted for approximately 2 percent of the total and the bulk consisted of 5 marine species, amounting to 86.7 percent of the entire output. Commercial species of the interior waters represented 8.5 percent; while the anadromous forms, those fish which migrate from salt water to fresh water for spawning and are largely of a commercial classification, represented 2.7 percent; the balance, less than 1 percent, comprising various miscellaneous forms. This represents an increase in the game fishes, an increase in the marine varieties, and a drop for both the commercial species of the interior waters and the anadromous types. The figures for output include the fishes salvaged from the overflowed areas in the upper Mississippi River, including those which are replanted directly in the waters of the river itself and the very small percentage which is distributed to more distant points. Summarizing, 18 individual species were produced in larger numbers than during the previous year, and the details are tabulated above.

COOPERATION WITH OTHER CONSERVATION AGENCIES

The existence of an International Association of Game Fish and Conservation Commissioners, comprising the fish and game authorities of most of the States, the Dominion of Canada, and some of the Canadian Provinces, demonstrates the importance attached to concerted action in meeting mutual problems. Cooperation is a potent force in fisheries conservation and the Division of Fish Culture has had the fullest possible recourse to the benefits arising from joint deliberation and action with agencies engaged in like activities. While one of the primary original functions of the division was to assist the States in maintaining fish resources, many of the States have now developed to a point where their efforts can be advantageously coordinated with those of the Bureau.

Much of the common effort is a result of the contacts maintained by the Bureau's field employees in charge of the hatcheries with the State fish and game personnel. No formal agreements or programs are necessary to enable these individuals to take advantage of various opportunities for good management requiring the joint use of equipment, etc. As the Bureau's appropriations have decreased it is becoming more vital that the States undertake to supplement Federal fish-cultural work by contributing in one form or another to the support of the propagation activities, and especially by acting as a distributing agency for the fish produced in the Bureau's hatcheries.

The collection of eggs, operation of hatcheries, and distribution of fish are fields in which cooperation aids efficiency and permits economy. In at least 21 States relationships of the foregoing type have been established or continued. At least 6 other States have received special services or aid from the division in addition to the routine activity of distributing fish in State waters. The joint operation of a pike-perch hatchery on Lake Champlain by the division and the States of Pennsylvania and Vermont was discontinued, but other useful contacts with these agencies were continued in force. Likewise the striped bass hatchery at Weldon, N.C., formerly operated with the assistance of the State, was not opened, but trout eggs and bass were assigned to the State for its own hatcheries. Even closer affiliations than last year were maintained with the States of Maryland and Virginia, particularly in the distribution by the States of fish produced in Bureau hatcheries. Cooperative arrrangements for the collection of trout eggs in the Rocky Mountain States, of eggs of commercial species in the Great Lakes region, and in the propagation of salmon on the Pacific coast are now established on routine procedure.

With regard to cooperation with other Federal agencies, there are no other organizations of the central Government performing functions related to those of the Bureau of Fisheries. In dealing with a natural resource there is, however, considerable contact with Bureaus concerned with some phase of conservation or administration of natural resources of the public domain. In fact, in assuming responsibility to a large degree for the maintenance of fishing in national parks and natoinal forests the Bureau must work in intimate relationship with the agencies and officials controlling and administering those areas. During the past year there has been evidence of a mutual recognition of the problems involved and of the difficulties confronting the Bureau. Policies at one time uncertain or conflicting have been worked out until now the difficulties are chiefly those concerned with ways and means and the overcoming of natural obstacles.

The Bureau attempts to serve all other Federal agencies insofar as they deal with fishery matters to the fullest extent of its resources. Throughout the year the policy has been to view all requests for cooperation or aid from whatever source strictly in the light of ability to assist, rather than as a question of desirability.

COOPERATION WITH SPORTSMEN'S ORGANIZATIONS

The desirability of sportsmen's organizations receiving fish from the Federal or State hatcheries for rearing in ponds or nurseries sponsored and operated by the clubs is now universally accepted. The diminution in the extent of these activities during the fiscal year 1933 was the result of financial and economic conditions rather than doubt as to the value of such activities. It would be most desirable that the cooperative and auxiliary private rearing ponds should be increased in number and capacity as the Bureau's activities are being curtailed, since such curtailment means a planting from Federal hatcheries of a larger number of fish at a smaller size. However, during the present year only 88 organizations deemed themselves able to maintain their own fish nurseries, and the fish allotted to them comprised slightly over 3,500,000 in comparison with over 4,000,000

furnished to 116 organizations during the previous year. As usual these allotments consisted of trout, since the bass nurseries are not yet developed to any extent and the supply of fry at the hatcheries is extremely limited.

Cooperative nurseries and rearing ponds supervised by the Bureau in 1933

Locality	Number of fish supplied	Kind
Iowa:		
Decorah	5,000	Loch Leven trout.
Massachusetts:		
Adams	25,000	Brook trout.
Blanford	5,000	Do.
Florence	19,000	Do.
Great Barrington	10,000	Do.
Lowell	10,000	Do.
Pittsford	20,000	Do.
Springfield (2 nurseries).	45,000	Do.
Michigan:		
Gaylord	100,000	Do.
Harrison	150,000	Do.
Do	45,000	Rainbow trout.
Highland	10,000	Brook trout.
Do	5,000	Loch Leven trout.
Hillman	100,000	Brook trout.
Lupton	200,000	Do.
Spruce	25,000	Rainbow trout.
Vanderbilt	100,000	Brook trout.
Minnesota:		
Anoka	5,000	Do.
Kenyon	3,000	Rainbow trout.
Lake City	10,000	Brook trout.
Do	5,000	Rainbow trout.
Northfield	5,000	Do.
Red Wing	3,000	Do.
Do	8,000	Loch Leven trout.
Rushford	25,000	Do.
Winona	10,000	Brook trout.
New Hampshire:		
Claremont	10,000	Do.
East Hampton	10,000	Do.
Peterboro	10,000	Do.
New York:		
Arena	29,500	Loch Leven trout.
Barneveld	682,650	Brook trout.
Do	150,420	Rainbow trout.
Do	7,650	Loch Leven trout.
Do	5,000	Landlocked salmon.
Do	880	Lake trout.
Lowville	20,000	Brook trout.
Malone	82,800	Do.
North Franklin	96,500	Do.
Do	15,000	Loch Leven trout.
Watertown	60,000	Brook trout.
Pennsylvania:		
Altoona	80,000	Do.
Berwick	40,000	Do.
Do	25,600	Rainbow trout.
Bethlehem	37,500	Brook trout.
Coatesville	30,000	Do.
Do	21,600	Loch Leven trout.
Fairmont Springs	25,000	Brook trout.
Do	10,800	Loch Leven trout.
Galeton	40,000	Brook trout.
Hazleton	50,000	Do.
Henryville	15,000	Do.
Do	14,850	Rainbow trout.
Indiana	10,000	Brook trout.
Johnstown	10,000	Do.
Do	9,600	Rainbow trout.
Kane	15,000	Brook trout.
Marienville	10,000	Do.
Monaca	5,000	Do.
Pennsylvania—Con.		
Muncy	10,000	Brook trout.
Do	15,000	Loch Leven trout.
Oil City	9,600	Rainbow trout.
Do	10,800	Loch Leven trout.
Punxsutawney	10,000	Brook trout.
Rising Springs	15,000	Do.
Do	15,000	Rainbow trout.
Scranton	25,650	Do.
Do	25,650	Loch Leven trout.
Weikert	16,150	Rainbow trout.
Do	14,000	Loch Leven trout.
West Pittston	15,000	Brook trout.
Do	5,400	Loch Leven trout.
White Haven	27,500	Brook trout.
Do	24,250	Rainbow trout.
Williamsport (3 nurseries).	70,000	Brook trout.
Do	14,000	Loch Leven trout.
Vermont:		
Averill	105,000	Brook trout.
Do	7,000	Lake trout.
Do	18,000	Landlocked salmon.
Weston	20,000	Brook trout.
West Virginia:		
Durbin	40,000	Do.
Do	10,000	Rainbow trout.
Wisconsin:		
Appleton	5,000	Brook trout.
Arcadia	15,000	Do.
Blue River	3,000	Do.
Do	3,000	Rainbow trout.
Do	3,000	Loch Leven trout.
Boscobel	20,000	Brook trout.
Do	5,000	Rainbow trout.
Eau Claire (2 nurseries).	50,000	Do.
Ellsworth	5,000	Loch Leven trout.
Elmwood	3,000	Brook trout.
Elroy	15,000	Do.
Galesville	20,000	Do.
Gays Mills	5,000	Do.
Hazel Green	12,000	Do.
Independence	25,000	Do.
La Crosse	10,000	Do.
Do	15,000	Loch Leven trout.
Madison	3,000	Brook trout.
Do	3,000	Loch Leven trout.
Do	3,000	Rainbow trout.
Manitowoc	20,000	Loch Leven trout.
Mindoro	15,000	Brook trout.
Do	9,000	Rainbow trout.
Monroe	28,000	Do.
Mountain	10,000	Do.
Nekoosa	20,000	Brook trout.
Plum City	3,000	Do.
Do	7,000	Rainbow trout.
Rothschild	13,000	Brook trout.
Shell Lake	12,000	Loch Leven trout.
Shullsburg	10,000	Do.
Stanley	20,000	Brook trout.
Stevens Point	25,000	Rainbow trout.
Viola	15,000	Brook trout.
Wausau	15,000	Do.
Whitehall	15,000	Do.
Total	3,561,350	

A number of the larger nurseries, particularly those at Watertown and Barneveld, N.Y., Hillman, Mich., and at several other points are operated as substations to the Bureau's hatcheries but are listed here-

with in order to give a complete picture of the extent to which sportsmen's clubs have participated in this movement. The majority of the establishments shown below have been in operation for several years and the turn-over, meaning the abandonment of older nurseries and the initiation of new ones, is becoming less each year. The inefficient establishments or those lacking suitable facilities have been weeded out by unsatisfactory results during the first year or two of operation. The State of Pennsylvania again cooperated by delivering 475,000 brook trout to nurseries located within that State. Many of the other States maintain their own system of cooperative rearing projects, so that the total list of interested individual sportsmen or sportsmen's organizations who have taken upon themselves the responsibility of an active effort toward maintenance of good fishing will number several hundred.

SALVAGE OPERATIONS

As usual, the landlocked pools in the upper Mississippi River area, including the Wild Life Refuge in that section, were covered by seining crews sent out to salvage the fish and prevent their loss by the complete drying up of sloughs and backwaters. This work was somewhat more extensive than during the previous year, and the total collections represent an increase of almost one-third. In this total, however, there are almost 3,000,000 fish which were produced in artificially controlled rearing and hatching ponds. These are located at advantageous points within the refuge and adjoining territory and are operated as auxiliaries to the La Crosse (Wis.) hatchery. Since these fish are produced independently of the natural supply, a much larger percentage of them is used for supplying applicants at more distant points. The rescued fish are very largely returned to the Mississippi River and its tributaries, from which they are derived.

Number and disposition of fish rescued, fiscal year 1933

Locality and species	Delivered to applicants	Restored to original waters	Total number of fish rescued
All stations:			
Buffalofish		1,053,370	1,053,370
Carp		3,281,710	3,281,710
Catfish	405,460	29,416,160	29,821,620
Crappie	10,280	14,809,830	14,820,110
Fresh-water drum		15,000	15,000
Largemouth black bass	334,200	322,650	656,850
Pike and pickerel		168,760	168,760
Sunfish	526,480	17,511,720	18,038,200
White bass		21,520	21,520
Yellow perch	41,780	326,770	368,550
Miscellaneous fishes		7,638,460	7,638,460
Total	1,318,200	74,565,950	75,884,150
Summary by stations:			
Bellevue, Iowa	97,330	7,739,290	7,836,620
Fairport, Iowa	35,490	130,030	165,520
Homer, Minn	224,680	19,056,940	19,281,620
La Crosse, Wis	285,810	8,634,270	8,920,080
Lynxville, Wis	78,910	8,447,450	8,526,360
Marquette, Iowa	92,980	28,132,860	28,225,840
Refuge and cooperative ponds	503,000	2,425,110	2,928,110
Total	1,318,200	74,565,950	75,884,150

ASSIGNMENTS OF FISH EGGS TO STATES, TERRITORIES, AND FOREIGN COUNTRIES

The Division of Fish Culture is in part an agency supplying raw material to other organizations engaged in the propagation of fish. These raw materials, largely in the form of fish eggs, are furnished to a number of the States, as well as to certain foreign Governments. The shipments to foreign Governments were somewhat reduced below the figures for prior years and consist largely of assignments to South American countries. The assignments to Canada consist of trout eggs, furnished in exchange for Atlantic salmon eggs supplied by the Canadian Government. It may be pointed out that all foreign shipments of fish are made only at the solicitation of the Governments of the countries receiving them, and these requests must be submitted through diplomatic channels. The assignments of fish eggs to various States amounts to slightly over 39,000,000, in comparison with 149,500,000 furnished the previous year. This difference is largely attributed to the absence of any allocation of pike-perch or whitefish during 1933. The other species, almost entirely trout, were furnished in slightly increased numbers to 22 States and Territories, in comparison with 24 receiving them the previous year. The value of these assignments and exchanges lies in the fact that many of the States are able to receive species which they could not otherwise obtain readily, and the cost of securing a supply of eggs for their hatcheries is materially reduced when they are furnished through the Bureau of Fisheries.

Shipments of fish and fish eggs to foreign countries, fiscal year 1933

County and species	Eggs	Fish	County and species	Eggs	Fish
Canada:			Ecuador: Rainbow trout	50,000	
Lake trout	250,000		Panama: Rainbow trout	20,000	
Loch Leven trout	801,000		Venezuela:		
Rainbow trout	473,000		Carp		200
Cuba:			Catfish		200
Bream		120			
Carp		75	Total	1,594,000	715
Catfish		120			

Assignments of fish eggs to State and Territorial fish commissions, fiscal year 1933

State and species	Number	State and species	Number
California: Brook trout	27,000	New Mexico:	
Colorado:		Loch Leven trout	1,000,000
Lake trout	25,000	Rainbow trout	315,000
Loch Leven trout	1,152,000	North Carolina: Rainbow trout	210,000
Steelhead salmon	150,000	Oregon:	
Connecticut: Loch Leven trout	150,000	Black-spotted trout	1,000,000
Georgia: Rainbow trout	255,000	Chinook salmon	6,524,000
Hawaii: Steelhead salmon	12,000	Silver salmon	451,000
Idaho:		Sockeye salmon	3,011,000
Black-spotted trout	1,025,000	Steelhead salmon	50,000
Rainbow trout	1,100,000	South Carolina: Rainbow trout	301,000
Maine:		South Dakota: Loch Leven trout	501,000
Atlantic salmon	500,000	Tennessee: Rainbow trout	206,000
Lake trout	150,000	Utah:	
Massachusetts:		Black-spotted trout	250,000
Chinook salmon	50,000	Loch Leven trout	301,000
Loch Leven trout	100,000	Vermont:	
Rainbow trout	50,000	Brook trout	330,000
Michigan:		Lake trout	100,000
Lake trout	165,000	Washington:	
Landlocked salmon	10,000	Black-spotted trout	1,300,000
Rainbow trout	200,000	Humpback salmon	2,608,000
Montana:		Wyoming:	
Loch Leven trout	5,850,000	Black-spotted trout	750,000
Silver salmon	502,000	Lake trout	100,000
Nebraska: Rainbow trout	100,000	Loch Leven trout	750,000
Nevada:			
Loch Leven trout	250,000	Total	39,171,000
Rainbow trout	550,000		

TRANSFERS OF EGGS BETWEEN STATIONS

As hitherto, the interdependability of the Federal hatchery system is illustrated by the widespread transfer of fish eggs between the various units as shown in the column below. Many of the hatcheries or substations are operated largely as a source of egg supply, enabling the hatcheries at more distant points to handle a much larger number of fish at a greatly reduced cost.

Transfer of eggs between stations, fiscal year 1933

Species	Number of eggs	From—	To—
Atlantic salmon	25,000	Craig Brook, Maine	Grand Lake Stream, Maine.
Black-spotted trout	500,500	Bozeman, Mont	Glacier Park, Mont.
	10,000	Birdsview, Wash	Leetown, W.Va.
	21,000	Quilcene, Wash	Mount Rainier, Wash.
	25,000	Saratoga, Wyo	Bozeman, Mont.
	200,000	Yellowstone Park, Wyo	Birdsview, Wash.
	200,300	do	Clackamas, Oreg.
	150,000	do	Glacier Park, Mont.
	500,200	do	Leadville, Colo.
	125,100	do	Creede, Colo.
	30,100	do	Bourbon, Mo.
	350,000	do	Saratoga, Wyo.
	25,200	do	Crawford, Nebr.
	600,000	do	Springville, Utah.
Brook trout	308,400	Berkshire, Mass	Nashua, N.H.
	138,800	Madison Valley, Mont	Bozeman, Mont.
	120,000	Craig Brook, Maine	Grand Lake Stream, Maine.
	905,000	do	Cape Vincent, N.Y.
	300,000	do	Barneveld, N.Y.
	200,000	do	Ithaca, N.Y.
	50,000	do	Erwin, Tenn.
	50,000	do	Flintville, Tenn.
	400,000	do	La Crosse, Wis.
	150,000	do	Manchester, Iowa.
	650,000	do	White Sulphur Springs, W.Va.
	250,000	Leadville, Colo	Bozeman, Mont.
	50,000	do	Clackamas, Oreg.
	400,000	do	La Crosse, Wis.
	100,000	do	Therma, N.Mex.
	300,000	do	Spearfish, S.Dak.
	151,000	do	Crawford, Nebr.
	200,000	do	Springville, Utah.
	357,000	Creede, Colo	Bozeman, Mont.
	785,000	do	Leadville, Colo.
	271,000	do	Manchester, Iowa.
	250,000	do	Saratoga, Wyo.
	150,000	do	Crawford, Nebr.
	13,500	Pittsford, Vt	Ithaca, N.Y.
	50,000	do	Leetown, W.Va.
	12,500	do	York Pond, N.H.
	10,000	York Pond, N.H	Craig Brook, Maine.
	600,000	do	Erwin, Tenn.
	300,000	do	Flintville, Tenn.
	20,000	do	Leetown, W.Va.
	100,000	do	Nashua, N.H.
	1,250,000	do	Northville, Mich.
	1,409,000	do	St. Johnsbury, Vt.
	40,000	do	Pittsford, Vt.
	1,250,000	do	White Sulphur Springs, W.Va.
	700,000	do	Wytheville, Va.
Chinook salmon	525,000	Battle Creek, Calif	Baird, Calif.
	10,000	Little White Salmon, Wash	Central Station, Washington, D.C.
	600,000	do	Clackamas, Oreg.
	3,108,000	do	Puget Sound stations.
Chum salmon	2,400,000	Quilcene, Wash	Duckabush, Wash.
Gisco	800,000	Cape Vincent, N.Y	Central Station, Washington, D.C.
	400,000	do	Nashua, N.H.
Dolly Varden trout	154,000	Afognak, Alaska	Puget Sound stations.
Grayling	30,000	Pittsford, Vt	Leetown, W.Va.
Landlocked salmon	5,000	Craig Brook, Maine	Barneveld, N.Y.
	25,000	do	Nashua, N.H.
	50,000	do	Grand Lake Stream, Maine.
	50,000	do	Bear Lake, Utah.
	35,000	do	St. Johnsbury, Vt.
	525,000	Grand Lake Stream, Maine	Craig Brook, Maine.

Transfer of eggs between stations, fiscal year 1933—Continued

Species	Number of eggs	From—	To—
Loch Leven trout	200,000	Madison Valley, Mont	Cape Vincent, N.Y.
	100,000	do	Bozeman, Mont.
	202,000	do	Creede, Colo.
	400,000	do	La Crosse, Wis.
	200,000	do	Leetown, W.Va.
	100,000	do	Manchester, Iowa.
	50,000	do	Northville, Mich.
	151,000	do	Puget Sound stations.
	25,000	do	St. Johnsbury, Vt.
	301,000	do	Saratoga, Wyo.
	251,000	do	Spearfish, S.Dak.
	101,000	do	Crawford, Nebr.
	301,000	do	Springville, Utah.
	300,000	do	White Sulphur Springs, W.Va.
	100,000	do	Wytheville, Va.
	60,000	Leadville, Colo	Therma, N.Mex.
Pike-perch	2,100,000	Put in Bay, Ohio	Central Station, Washington, D.C.
Rainbow trout	75,000	Eagle Nest Lake, N.Mex	Cape Vincent, N.Y.
	75,000	do	Ithica, N.Y.
	220,000	do	Leadville, Colo.
	100,000	do	Bourbon, Mo.
	65,000	do	Saratoga, Wyo.
	251,000	do	Crawford, Nebr.
	304,000	Manchester, Iowa	Bozeman, Mont.
	52,000	do	Ogletown, Pa.
	475,000	do	La Crosse, Wis.
	877,000	do	Leadville, Colo.
	77,000	do	Creede, Colo.
	52,000	do	Northville, Mich.
	303,000	do	Saratoga, Wyo.
	209,000	do	Crawford, Nebr.
	681,000	Neosho, Mo	Bozeman, Mont.
	200,000	Bourbon, Mo	Flintville, Tenn.
	150,000	do	Creede, Colo.
	100,000	do	Northville, Mich.
	550,000	do	Saratoga, Wyo.
	50,000	do	White Sulphur Springs, W.Va.
	100,000	Springville, Utah	Creede, Colo.
	100,000	White Sulphur Springs, W.Va	Cortland, N.Y.
	125,000	do	Leetown, W.Va.
	50,000	Wytheville, Va	Barneveld, N.Y.
	28,000	do	Central Station, Washington, D.C.
	21,000	do	Leetown, W.Va.
	75,000	do	Nashua, N.H.
Silver salmon	400,000	Applegate Creek, Oreg	Butte Falls, Oreg.
	650,000	Quinault, Wash	Birdsview, Wash.
	251,000	do	Clackamas, Oreg.
Sockeye salmon	100,000	Birdsview, Wash	Little White Salmon, Wash.
	500,000	do	Quilcene, Wash.
Steelhead salmon	82,000	do	Hagerman, Idaho.
	335,000	Applegate Creek, Oreg	Butte Falls, Oreg.
	75,000	do	Hagerman, Idaho.
	100,000	do	Charlevoix, Mich.

OUTPUT OF FISH

A total of 91 establishments contributed to the production of the 1933 output of fish. These comprised 42 main stations and 49 substations. The previous year 84 establishments had been in operation. The hatcheries, field stations, etc., covered 39 States and the Territory of Alaska. The increase in the number of stations was due to the opening of 6 new hatcheries authorized under the 5-year building program and the reopening of an auxiliary rearing station. However, during the year 3 fish-cultural units were discontinued, so that at the close of the period only 88 were in operation and preparations were being made for the closure of several others.

Stations, and substations operated and the output of each, fiscal year 1933

[Asterisk (*) denotes transfer of eggs, see table, p. 459]

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total [1]
Afognak, Alaska:				
Dolly Varden trout	154,000			154,000
Humpback salmon	2,228,000			2,228,000
Sockeye salmon		17,600,000		17,600,000
Baird, Calif.:				
Chinook salmon			857,500	857,500
Battle Creek, Calif.:				
Chinook salmon	(*)		3,417,800	3,417,800
Mill Creek, Calif.:				
Chinook salmon			1,667,900	1,667,900
Baker Lake, Wash.:				
Loch Leven trout			67,000	67,000
Silver salmon			404,000	404,000
Sockeye salmon			802,000	802,000
Birdsview, Wash.:				
Black-spotted trout	(*)		6,000	6,000
Brook trout			175,050	175,050
Chinook salmon		532,000	8,132	540,132
Rainbow trout			67,250	67,250
Silver salmon		1,166,000	113,592	1,279,592
Sockeye salmon	(*)		484,000	484,000
Steelhead salmon	* 113,000		672,000	785,000
Duckabush, Wash.:				
Chinook salmon			268,000	268,000
Chum salmon		13,616,000		* 13,616,000
Silver salmon			262,000	262,000
Steelhead salmon			108,000	108,000
Quilcene, Wash.:				
Black-spotted trout	(*)		4,020	4,020
Brook trout			144,010	144,010
Chinook salmon			266,000	266,000
Chum salmon	(*)	7,978,000		7,978,000
Silver salmon		765,000	502,000	1,267,000
Sockeye salmon			210,000	210,000
Steelhead salmon			283,319	283,319
Sultan, Wash.:				
Chinook salmon			137,200	137,200
Silver salmon			14,800	14,800
Berkshire trout hatchery, Mass.:				
Brook trout	* 3,000		209,980	212,980
Catfish			1,000	1,000
Rainbow trout			1,850	1,850
Smallmouth black bass		565,000	450	565,450
Boothbay Harbor, Maine:				
Cod	892,455,000			892,455,000
Haddock	509,457,000			509,457,000
Winter flounder		2,414,292,000		2,414,292,000
Bozeman, Mont.:				
Black-spotted trout	* 90,000		2,712,420	2,802,420
Brook trout			[2] 461,275	461,275
Loch Leven trout			226,700	226,700
Rainbow trout	(*)		[3] 1,196,425	1,196,425
Steelhead salmon			[4] 356,600	356,600
Glacier Park, Mont.:				
Black-spotted trout			880,770	880,770
Brook trout			99,073	99,073
Rainbow trout			79,073	79,073
Madison Valley, Mont.:				
Black-spotted trout			[5] 1,345,600	1,345,600
Brook trout	(*)			
Grayling		146,350		146,350
Loch Leven trout	* 11,818,320	2,268,300	3,332,000	17,418,620
Rainbow trout	400,500		787,700	1,188,200
Miles City, Mont.:				
Largemouth black bass			[6] 29,890	29,890
Catfish			[7] 9,075	9,075
Crappie			[8] 196,405	196,405
Sunfish			[9] 241,145	241,145
Yellow perch			[10] 7,860	7,860
Miscellaneous fishes			[11] 3,750	3,750

[1] Loss in transit 31,906.
[2] Includes 18,280 fingerling brook trout turned over to the State of Monatana in cooperative work.
[3] Includes 111,000 fingerling rainbow trout turned over to the State of Montana in cooperative work.
[4] Includes 175,000 fingerling steelhead salmon turned over to the State of Montana in cooperative work.
[5] Included 460,000 fingerling black-spotted trout turned over to the State of Montana in cooperative work.
[6] Includes 9,135 fingerling largemouth black bass turned over to the State of Montana in cooperative work.
[7] Includes 5,075 fingerling catfish turned over to the State of Montana in cooperative work.
[8] Includes 84,505 fingerling crappie turned over to the State of Montana in cooperative work.
[9] Includes 65,625 fingerling sunfish turned over to the State of Montana in cooperative work.
[10] Includes 5,880 fingerling yellow perch turned over to the State of Montana in cooperative work.
[11] Turned over to the State of Montana in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1933—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Cape Vincent, N.Y.:				
Brook trout		830,000		830,000
Cisco	(*)	15,100,000		15,100,000
Lake trout		41,000		41,000
Loch Leven trout		168,000		168,000
Rainbow trout		68,300		68,300
Smallmouth black bass			124,665	124,665
Whitefish		1,071,000		1,071,000
Barneveld, N.Y.:				
Brook trout			293,500	293,500
Lake trout			750	750
Loch Leven trout			3,370	3,370
Rainbow trout			19,100	19,100
Ithaca, N.Y.:				
Brook trout			[12] 313,595	313,595
Lake trout			3,660	3,660
Loch Leven trout			15,360	15,360
Rainbow trout		60,000	132,950	192,950
Rochester, N.Y.:				
Largemouth black bass			26,506	26,506
Sunfish			1,229	1,229
Watertown, N.Y.:				
Black-spotted trout			8,700	8,700
Brook trout			701,344	701,344
Lake trout			62,360	62,360
Loch Leven trout			152,033	152,033
Rainbow trout			41,200	41,200
Clackamas, Oreg.:				
Brook trout	2,000		12,000	14,000
Chinook salmon			4,110,000	4,110,000
Applegate Creek, Oreg.:				
Silver salmon	(*)			
Steelhead salmon	*225,000			225,000
Big White salmon, Wash.:				
Brook trout			27,200	27,200
Chinook salmon	6,174,000	2,405,000	[13] 7,927,000	16,506,000
Butte Falls, Oreg.:				
Black-spotted trout			[14] 20,400	20,400
Chinook salmon			2,465,000	2,465,000
Silver salmon			[15] 300,000	300,000
Little White Salmon, Wash.:				
Black-spotted trout			82,500	82,500
Chinook salmon	4,190,500	10,500,000	[16] 10,487,000	25,177,500
Sockeye salmon			91,000	91,000
Salmon, Idaho:				
Chinook salmon			2,475,000	2,475,000
Rainbow trout			315,500	315,500
Steelhead salmon			[17] 40,000	40,000
Craig Brook, Maine:				
Atlantic salmon	*500,000		464,700	964,700
Brook trout	(*)		718,440	718,440
Landlocked salmon	*25,000		481,100	506,100
Grand Lake Stream, Maine:				
Atlantic salmon			9,850	9,850
Brook trout			51,000	51,000
Landlocked salmon	(*)		385,500	385,500
Crawford, Nebr.:				
Largemouth black bass			42,035	42,035
Black-spotted trout			24,000	24,000
Brook trout			147,000	147,000
Catfish			61,100	61,100
Crappie			2,000	2,000
Loch Leven trout			100,000	100,000
Rainbow trout			218,000	218,000
Sunfish			82,200	82,200
Yellow perch			45,150	45,150
Dexter, N.Mex.:				
Largemouth black bass			[18] 257,790	257,790
Crappie			375	375
Sunfish			[19] 146,510	146,510

[12] Includes 500 fingerling brook trout turned over to the State of New York in cooperative work.
[13] Includes 37,000 fingerling chinook salmon turned over to the State of Washington in cooperative work.
[14] Includes 10,000 fingerling black-spotted trout turned over to the State of Oregon in cooperative work.
[15] Includes 300,000 fingerling silver salmon turned over to the State of Oregon in cooperative work.
[16] Includes 155,000 fingerling chinook salmon turned over to the State of Oregon in cooperative work.
[17] Includes 20,000 fingerling steelhead salmon turned over to the State of Idaho in cooperative work.
[18] Includes 54,600 fingerling largemouth black bass turned over to the State of New Mexico in cooperative work.
[19] Includes 30,000 fingerling sunfish turned over to the State of New Mexico in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1933—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Duluth, Minn.:				
Lake trout		6,992,000		6,992,000
Pike perch		15,775,000		15,775,000
Whitefish		6,050,000		6,050,000
Edenton, N.C.:				
Largemouth black bass		[20] 97,000	118,750	215,750
Crappie			[21] 6,920	6,920
Glut herring		25,000,000		25,000,000
Shad		1,200,000		1,200,000
Warmouth bass			3,250	3,250
White perch		3,350,000		3,350,000
Yellow perch		3,750,000	495	3,750,495
Erwin, Tenn.:				
Largemouth black bass			12,345	12,345
Brook trout			51,050	51,050
Loch Leven trout			17,100	17,100
Rainbow trout			276,232	276,232
Rock bass			6,315	6,315
Sunfish			8,098	8,098
Fairport, Iowa:				
Largemouth black bass			73,928	73,928
Buffalofish			[22] 4,850	4,850
Carp			[22] 7,875	7,875
Catfish			120,847	120,847
Crappie			59,096	59,096
Smallmouth black bass			16,659	16,659
Sunfish			67,624	67,624
Yellow perch			320	320
Miscellaneous fishes			1,690	1,690
Flintville, Tenn.:				
Brook trout			34,650	34,650
Loch Leven trout			6,135	6,135
Rainbow trout			146,768	146,768
Fort Humphreys, Va.:				
Shad		18,400,000		18,400,000
Yellow perch		[23] 105,885,000		105,885,000
Dumfries, Va.:				
Largemouth black bass		4,800	6,435	11,235
Common pike			850	850
Yellow perch		63,300,000		63,300,000
Featherstone, Va.:				
Largemouth black bass		32,600	38,070	70,670
Carp			75	75
Sunfish			30,960	30,960
Warmouth bass			4,200	4,200
Lakeland, Md.:				
Largemouth black bass		73,000	3,698	76,698
Crappie			30	30
Sunfish			12,025	12,025
Ogletown, Pa.:				
Brook trout			107,655	107,655
Rainbow trout			13,560	13,560
Gloucester, Mass.:				
Cod	605,171,000	305,199,000		910,370,000
Haddock	194,793,000	29,533,000		224,326,000
Pollock		13,861,000		13,861,000
Winter flounder		47,992,000		47,992,000
La Crosse, Wis.:				
Largemouth black bass			[24] 42,000	42,000
Brook trout			893,500	893,500
Buffalofish			[22] 4,150	4,150
Carp			[22] 283,700	283,700
Catfish			[25] 3,177,830	3,177,830
Crappie			2,057,130	2,057,130
Fresh-water drum			200	200
Loch Leven trout			352,928	352,928
Pike and pickerel			58,800	58,800
Rainbow trout			290,500	290,500
Sunfish			[26] 2,946,165	2,946,165
White bass			9,800	9,800

[20] Includes 16,000 fry largemouth black bass turned over to the State of North Carolina in cooperative work.
[21] Includes 350 fingerling crappie turned over to the State of North Carolina in cooperative work.
[22] All carp and buffalofish shown in above table are planted in commercial areas of the Mississippi River.
[23] Includes 39,000,000 fry yellow perch turned over to the State of Virginia in cooperative work.
[24] Includes 6,105 fingerling largemouth black bass turned over to the State of Wisconsin in cooperative work.
[25] Includes 158,700 fingerling catfish turned over the the State of Wisconsin in cooperative work.
[26] Includes 248,815 fingerling sunfish turned over to the State of Wisconsin in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1933—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
La Crosse, Wis.—Continued.				
Yellow perch			[27] 80, 300	80, 300
Miscellaneous fishes			260, 000	260, 000
Bellevue, Iowa:				
Largemouth black bass			[28] 95, 900	95, 900
Buffalofish	67, 545, 000		[22] 695, 500	68, 240, 500
Carp	9, 000, 000		[22] 907, 500	9, 907, 500
Catfish			[29] 2, 740, 015	2, 740, 015
Crappie			573, 175	573, 175
Fresh-water drum			86	86
Pike and pickerel			4, 239	4, 239
Sunfish			1, 789, 900	1, 789, 900
White bass			1, 016	1, 016
Yellow perch			296	296
Miscellaneous fishes			1, 029, 000	1, 029, 000
Ferryville, Wis.: Buffalofish	855, 000			855, 000
Guttenburg, Iowa:				
Buffalofish	23, 084, 000			23, 084, 000
Carp	7, 500, 000			7, 500, 000
Homer, Minn.:				
Largemouth black bass			[30] 222, 825	222, 825
Buffalofish			[22] 763	763
Carp			[22] 508, 837	508, 837
Catfish			[31] 3, 004, 375	3, 004, 375
Crappie			[32] 5, 404, 021	5, 404, 021
Fresh-water drum			8, 215	8, 215
Pike and pickerel			21, 110	21, 110
Sunfish			[33] 6, 311, 490	6, 311, 490
White bass			6, 114	6, 114
Yellow perch			170, 500	170, 500
Miscellaneous fishes			3, 623, 363	3, 623, 363
Harpers Ferry, Iowa:				
Buffalofish	2, 565, 000			2, 565, 000
Carp	7, 000, 000			7, 000, 000
Lynxville, Wis.:				
Largemouth black bass			42, 100	42, 100
Buffalofish			[22] 181, 310	181, 310
Carp			[22] 669, 960	669, 960
Catfish			[34] 3, 605, 800	3, 605, 800
Crappie			1, 439, 520	1, 439, 520
Pike and pickerel			12, 680	12, 680
Sunfish			[35] 1, 431, 190	1, 431, 190
White bass			760	760
Yellow perch			29, 700	29, 700
Miscellaneous fishes			1, 113, 350	1, 113, 350
Marquette, Iowa:				
Largemouth black bass			111, 644	111, 644
Buffalofish			[22] 166, 500	166, 500
Carp			[22] 854, 200	854, 200
Catfish			1, 705, 539	1, 705, 539
Crappie			5, 150, 720	5, 150, 720
Fresh-water drum			6, 500	6, 500
Pike and pickerel			65, 985	65, 985
Sunfish			4, 561, 875	4, 561, 875
White bass			3, 830	3, 830
Yellow perch			43, 549	43, 549
Miscellaneous fishes			264, 500	264, 500
Refuge and cooperative ponds, upper Mississippi River:				
Largemouth black bass			136, 978	136, 978
Buffalofish			[22] 300	300
Carp			[22] 49, 650	49, 650
Catfish			196, 300	196, 300
Crappie			157, 940	157, 940
Pike and pickerel			5, 950	5, 950
Sunfish			988, 885	988, 885
Yellow perch			43, 885	43, 885
Miscellaneous fishes			1, 348, 250	1, 348, 250
Rochester, Ind.:				
Largemouth black bass			11, 100	11, 100

[22] All carp and buffalofish shown in above table are planted in commercial areas of the Mississippi River.
[27] Includes 19,795 fingerling yellow perch turned over to the State of Wisconsin in cooperative work.
[28] Includes 6,000 fingerling largemouth black bass turned over to the State of Wisconsin in cooperative work.
[29] Includes 3,000 fingerling catfish turned over to the State of Wisconsin in cooperative work.
[30] Includes 140 fingerling largemouth black bass turned over to the State of Wisconsin in cooperative work.
[31] Includes 19,700 fingerling catfish turned over to the State of Wisconisn in cooperative work.
[32] Includes 500 fingerling crappie turned over to the State of Wisconsin in cooperative work.
[33] Includes 45,980 fingerling sunfish turned over to the State of Wisconsin in cooperative work.
[34] Includes 38,800 fingerling catfish turned over to the State of Wisconsin in cooperative work.
[35] Includes 6,975 fingerling sunfish turned over to the State of Wisconsin in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1933—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Leadville, Colo.:				
Black-spotted trout			487,600	487,600
Brook trout	*50,000		1,872,250	1,922,250
Loch Leven trout	(*)		80,800	80,800
Rainbow trout			327,000	327,000
Crystal Lake, Colo.: Brook trout			32,500	32,500
Creede, Colo.:				
Black-spotted trout			293,400	293,400
Brook trout	(*)		2,165,462	2,165,462
Loch Leven trout			178,500	178,500
Rainbow trout	50,160		793,200	843,360
Eagle Nest Lake, N.Mex.: Rainbow trout	*569,000		230,000	799,000
Leetown, W.Va.:				
Black-spotted trout			[36] 12,450	12,450
Brook trout			[37] 126,702	126,702
Loch Leven trout			31,971	31,971
Rainbow trout			[38] 92,856	92,856
Smallmouth black bass			4,500	4,500
Louisville, Ky.:				
Largemouth black bass		147,000	18,450	165,450
Crappie			300	300
Rock bass			4,550	4,550
Smallmouth black bass		222,000	1,570	223,570
Sunfish			7,550	7,550
Mammoth Spring, Ark.:				
Largemouth black bass			182,500	182,500
Rock bass			18,950	18,950
Smallmouth black bass			126,600	126,600
Sunfish			66,900	66,900
Manchester, Iowa:				
Brook trout			[39] 485,650	485,650
Loch Leven trout			[40] 80,700	80,700
Rainbow trout	*915,000		[41] 220,925	1,135,925
Rock bass			6,000	6,000
Smallmouth black bass			13,750	13,750
Nashua, N.H.:				
Brook trout	15,000		363,232	378,232
Catfish			2,800	2,800
Landlocked salmon			22,000	22,000
Rainbow trout	12,000		83,700	95,700
Smallmouth black bass		19,000	1,500	20,500
Neosho, Mo.:				
Largemouth black bass			63,036	63,036
Catfish			2,020	2,020
Crappie			38,800	38,800
Rainbow trout	*266,000		162,029	428,029
Rock bass			11,400	11,400
Sunfish			35,110	35,110
Bourbon, Mo.: Rainbow trout	*1,365,000			1,365,000
Langdon, Kans.:				
Largemouth black bass			171,018	171,018
Catfish			46,270	46,270
Crappie			54,925	54,925
Rock bass			375	375
Sunfish			171,955	171,955
Yellow perch			6,725	6,725
Natchitoches, La.:				
Largemouth black bass			4,900	4,900
Sunfish			125,000	125,000
Tishomingo, Okla.:				
Largemouth black bass			34,304	34,304
Catfish			18,668	18,668
Crappie			15,500	15,500
Sunfish			51,375	51,375

[36] Includes 12,000 fingerling black-spotted trout turned over to the State of West Virginia in cooperative work.

[37] Includes 20,200 fingerling brook trout turned over to the State of Virginia, and 17,500 fingerling brook trout turned over to the State of West Virginia in cooperative work.

[38] Includes 14,100 fingerling rainbow trout turned over to the State of Maryland, 9,640 fingerling rainbow trout turned over to the State of Virginia, and 13,695 fingerling rainbow trout turned over to the State of West Virginia in cooperative work.

[39] Includes 148,250 fingerling brook trout turned over to the State of Iowa in cooperative work.

[40] Includes 42,000 fingerling Loch Leven trout turned over to the State of Iowa in cooperative work.

[41] Includes 35,750 fingerling rainbow trout turned over to the State of Iowa in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1933—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Northville, Mich.:				
Largemouth black bass			3,800	3,800
Brook trout			1,020,200	1,020,200
Loch Leven trout			44,300	44,300
Rainbow trout			[42] 181,800	181,800
Smallmouth black bass			66,470	66,470
Alpena, Mich.:				
Lake trout	115,000	1,257,600	185,000	1,557,600
Whitefish		6,000,000		6,000,000
Charlevoix, Mich.:				
Lake trout	725,000	10,392,000	100,000	11,217,000
Steelhead salmon			78,632	78,632
Whitefish	500,000	33,600,000		34,100,000
Orangeburg, S.C.:				
Largemouth black bass			222,396	222,396
Catfish			150	150
Crappie			5,650	5,650
Sunfish			97,360	97,360
Warmouth bass			8,455	8,455
Yellow perch			2,100	2,100
Jacksonboro, S.C.: Shad		3,137,000		3,137,000
Put in Bay, Ohio:				
Pike perch	(*)	112,000,000		112,000,000
Whitefish		110,000,000		110,000,000
Quinault, Wash.:				
Chinook salmon			234,950	234,950
Silver salmon	*806,560	73,000		879,560
Sockeye salmon		12,274,000	1,418,000	13,692,000
St Johnsbury, Vt.:				
Largemouth black bass			2,680	2,680
Brook trout		1,330,289	8,700	1,338,989
Landlocked salmon		7,500	7,510	15,010
Steelhead salmon			24,625	24,625
Pittsford, Vt.:				
Black-spotted trout	12,000		9,170	21,170
Brook trout	*27,000		101,650	128,650
Grayling	(*)		25	25
Rainbow trout	20,000		[43] 24,971	44,971
York Pond, N.H.: Brook trout	*253,000	654,357	375,636	1,282,993
San Marcos, Tex.:				
Largemouth black bass		340,500	193,480	533,980
Catfish			615	615
Crappie			10,415	10,415
Rio Grande perch			2,815	2,815
Sunfish			67,940	67,940
Lake Worth, Tex.:				
Largemouth black bass			87,260	87,260
Catfish			2,310	2,310
Crappie			40,285	40,285
Sunfish			32,305	32,305
Warmouth bass			6,325	6,325
Saratoga, Wyo.:				
Black-spotted trout	(*)		290,150	290,150
Brook trout			799,350	799,350
Loch Leven trout			180,250	180,250
Rainbow trout			507,450	507,450
Spearfish, S. Dak.:				
Brook trout			261,712	261,712
Loch Leven trout			123,100	123,100
Rainbow trout			218,950	218,950
Springville, Utah:				
Largemouth black bass			1,221	1,221
Black-spotted trout	250,000		399,500	649,500
Brook trout			357,500	357,500
Loch Leven trout			127,000	127,000
Rainbow trout	*905,000		577,813	1,482,813
Bear Lake, Utah: Brook trout			308,000	308,000
Tupelo, Miss.:				
Largemouth black bass		25,500	282,595	308,095
Sunfish			366,634	366,634
Aliceville, Ala.:				
Largemouth black bass			5,259	5,259
Sunfish			78,587	78,587
Marion, Ala.:				
Largemouth black bass			95,380	95,380

[42] Includes 70,000 fingerling rainbow trout turned over to the State of Ohio in cooperative work.
[43] Includes 5,750 fingerling rainbow trout turned over to the State of Vermont in cooperative work.

Stations, and substations operated and the output of each, fiscal year 1933—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings, yearlings, and adults	Total
Valdosta, Ga.:				
Largemouth black bass			6,785	6,785
Catfish			345	345
Sunfish			88,820	88,820
Warm Springs, Ga.:				
Largemouth black bass		84,500	576,150	660,650
Sunfish			530,100	530,100
White Sulphur Springs, W.Va.:				
Largemouth black bass			48,700	48,700
Brook trout			[44] 2,192,540	2,192,540
Loch Leven trout			[45] 448,442	448,442
Rainbow trout	*160,600		[46] 786,759	947,359
Rock bass			7,080	7,080
Sunfish			29,235	29,235
Woods Hole, Mass.:				
Cod		193,139,000		193,139,000
Mackerel		5,127,000		5,127,000
White perch			630	630
Winter flounder		718,378,000		718,378,000
Wytheville, Va.:				
Largemouth black bass			22,411	22,411
Brook trout			[47] 324,700	324,700
Catfish			1,600	1,600
Loch Leven trout			26,500	26,500
Rainbow trout	*872,000		[48] 542,965	1,414,965
Rock bass			37,110	37,110
Smallmouth black bass			404	404
Sunfish			42,454	42,454
Yellowstone Park, Wyo.:				
Black-spotted trout	*6,193,000		7,545,000	13,738,000
Brook trout			74,500	74,500
Yes Bay, Alaska:				
Brook trout			36,000	36,000
Humpback salmon	380,000	154,000		534,000
Sockeye salmon	3,010,000	2,480,000	18,980,500	24,470,500

[44] Includes 770,600 fingerling brook trout turned over to the State of West Virginia in cooperative work.
[45] Includes 100,000 fingerling Loch Leven trout turned over to the State of West Virginia in cooperative work.
[46] Includes 332,600 fingerling rainbow trout turned over to the State of West Virginia in cooperative work.
[47] Includes 60,700 fingerling brook trout turned over to the State of Virginia in cooperative work.
[48] Includes 39,600 fingerling rainbow trout turned over to the State of Virginia and 18,090 fingerling rainbow trout turned over to the State of West Virginia in cooperative work.

EGG COLLECTIONS

The eggs collected from commercial species, wild trout, and from station brood stock constitute the raw material from which the distribution stock is produced. It will be noted from the following table that the collections for the past 2 years were practically the same as far as totals were concerned although there was considereable deviation as between various species. A reduction in such forms as the glut herring, some of the Pacific salmon, pike-perch, yellow perch, etc., was offset by a considerable increase in the take of cod eggs. The fact that the distribution of fish was larger than the previous year although there was a decline in the egg take indicates a greater efficiency and a higher percentage of hatch.

Comparison of egg collections, fiscal years 1933 and 1932

Species	1933	1932	Species	1933	1932
White sucker		17,275,000	Lake trout	33,414,000	43,982,930
Shad	27,355,000	37,342,000	Brook trout	23,833,130	24,115,810
Glut herring	84,826,000	117,220,000	Dolly Varden trout	175,000	2,731,420
Whitefish	211,452,500	133,215,000	Grayling	2,118,400	768,000
Cisco	26,840,000	35,200,000	Pike perch	296,925,000	717,393,190
Chinook salmon	55,268,300	73,432,400	Yellow perch	125,020,000	178,080,000
Chum salmon	22,651,000	20,035,000	Striped bass		2,095,000
Humpback salmon	3,082,500	8,432,000	White perch	5,400,000	13,700,000
Silver salmon	5,885,000	8,168,300	Cod	2,121,060,000	1,715,437,000
Sockeye salmon	62,566,800	69,123,220	Haddock	747,192,000	820,894,000
Steelhead salmon	3,065,300	2,791,000	Pollock	19,429,000	21,212,000
Landlocked salmon	840,000	994,980	Winter flounder	3,532,946,000	3,398,941,000
Rainbow trout	22,414,700	18,807,710	Mackerel	7,164,000	16,782,000
Black-spotted trout	26,667,700	11,484,300			
Lock Leven trout	22,881,100	21,674,200	Total	7,490,472,430	7,531,227,460

NOTES ON OPERATIONS

COMMERCIAL SPECIES

Pacific salmons.—The work of the hatcheries propagating the commercial salmons of the Pacific coast yielded an increased output for two species only—the chum salmon and the important sockeye salmon. A number of these stations handled game trout in addition to the main work with the salmons. In Alaska the Afognak station experienced an average season and special attention was given to improving conditions in Letnik Lake, in which the larger proportion of the output of the station is planted. However, this station was closed at the end of the year, owing to economy requirements and some question as to the value of its operations. At Yes Bay, Alaska, successful results were experienced during the fall of 1932 in the feeding and rearing of sockeye salmon fingerlings. Some 19,000,000 of these were reared and at least 4,000,000 were released at a length of 4 inches. An attempt to follow the same procedure during the spring and summer of 1933 was seriously interfered with by the outbreak of an epidemic, which caused a heavy loss among the fry and fingerlings. It was not possible to determine the cause or the most effective treatment for this trouble. A number of brook trout hatched and reared at the station was distributed in certain lakes in the vicinity by airplane.

In the California field the most striking development was a very sharp decline in the take of chinook salmon eggs, the total collections amounting to only a small fraction of the previous year. A special appropriation was available for improvement of the stations in this territory and was expended largely in remodeling the superintendent's residence at Baird and in the development of a deep well and pumping system for improving the water supply at Mill Creek. Other improvements of a minor nature were also accomplished with these funds. In the Columbia River section the main station at Clackamas enjoyed a normal season with both salmon and trout. The collection of salmon eggs, chiefly of the chinook variety, exceeded those of last year by some 9,000,000. Water supply pipe to the extent of 400 feet was laid at the Clackamas station. The Little White Salmon (Wash.) substation froze and stored 27 tons of spawned-out salmon for use in feeding the fingerling fish held at this point and at the Big White Salmon substation. At Butte Falls, Oreg., a new substation,

its equipment including a hatchery building, a residence, 24 standard hatching troughs, and 48 concrete rearing tanks, was placed in operation. This station handled over 2,000,000 salmon eggs and fry, together with a number of trout, during the year. It constitutes a splendid plant for efficiently serving the important Rogue River watershed. The Salmon (Idaho) substation did not succeed in collecting a large number of salmon eggs and for this reason its operations were limited.

At most of the stations in the Puget Sound territory favorable conditions permitted a fairly successful output, though their total egg collections were somewhat below those of the previous year. The run of sockeye salmon in Baker River, which is checked at the Baker River Dam, was somewhat below previous years. Work has continued on a highway leading to the Baker Lake hatchery and has been carried to the point where transportation of supplies by truck is feasible. At the Birdsview (Wash.) Station repeated floods have shown the necessity of diverting water from a nearby creek and work was started at the end of the year on the construction of an entirely new channel, which will relieve the flood difficulty in part. Repeated experimental plants of sockeye salmon in this creek have at last shown returns of a considerable number of this species, and it is evident that a new run of sockeyes has been built up by this means. The substation at Sultan, Wash., formerly operated chiefly for the collection of salmon eggs, was discontinued because of unsatisfactory returns. Over 10,000,000 chum salmon eggs were secured at one of the field egg-collecting stations and incubated in the Duckabush and Quilcene hatcheries. The new Mount Rainier substation, serving the national park of that name, was opened for the first time at the beginning of the year and supplied a considerable number of cutthroat, Loch Leven, and blackspotted trout fingerlings for waters in the park and its vicinity.

The Quinault (Wash.) station, serving chiefly the sockeye salmon fishery in Quinault Lake, collected 15,500,000 eggs of this species and smaller numbers of the other varieties. A considerable number of the resulting fry were reared to fingerling size before being distributed. The old hatchery water supply flume was replaced during the year with a 14-inch pipe line and a new concrete pipe drain was installed.

Great Lakes species.—The production of commercial species from 5 hatcheries in the Great Lakes area showed an increase for the whitefish but a moderate reduction in output of the other important forms including the lake herring or cisco, lake trout, and pike-perch. As has been the case in the last year or two, the Cape Vincent (N.Y.) station on Lake Ontario obtained only a negligible quantity of the eggs of the commercial varieties. This station therefore concentrated its activities upon the production of smallmouth bass at the main station and game trout at the 3 substations operated under its jurisdiction in New York State. At the latter points fairly successful results were obtained and considerable additional development work was performed at the Cortland (N.Y.) substation. At this point cooperative research in conjunction with Cornell University and the State Conservation Department is being conducted with the purpose of ascertaining basic physiological facts on the nutrition of trout. Put-in Bay (Ohio) station enjoyed an average season with the whitefish and pike-perch and did not undertake to collect the eggs of carp or yellow perch as heretofore.

In Michigan, the Charlevoix station had a successful season with a very satisfactory quality of eggs yielding a high percentage of hatch for the whitefish and lake trout. At Alpena, Mich., experiments with the use of a charcoal device for the eradication of chlorine in the water supply gave promise of overcoming a difficulty which has in the past produced heavy losses at this point. Approximately 600,000 lake trout fingerlings were retained for rearing. On Lake Superior the weather conditions were adverse to a successful collection of lake trout eggs and the take was somewhat below normal. The handling of 6,000,000 whitefish eggs was an improvement over the results for this species in the last few years. The distribution of the fry in the spring from the Charlevoix station was rendered difficult on account of early hatching before the fish could be transported by vessel. By various expedients including the use of truck, etc., the fry were returned to the spawning grounds in good condition. At Put-in Bay the joint use of the Bureau's steamer *Shearwater* by the State of Ohio and the Bureau's hatchery resulted in distinct economy.

Marine stations.—This group of 3 stations in New England propagate 4 species of strictly marine fish. Increase was registered in the output of cod and winter flounder. At Gloucester poor market conditions with no incentive for commercial operations reduced the catch of pollock and consequent collection of eggs. This station handled almost one billion cod eggs of which over 600,000,000 were planted after fertilization upon the spawning grounds, the balance being incubated in the hatchery. This is the main station at which haddock are handled, and during a short season over 235,000,000 eggs were taken. The propagation of flounders is concentrated at the other 2 stations located at Boothbay Harbor, Maine, and Woods Hole, Mass. An average or normal season prevailed at Boothbay Harbor, Maine, although there was a slight improvement in the take of haddock eggs all of which were planted directly on the spawning grounds because of the fact that the water at the hatchery was too warm for their incubation. An interesting feature is the fact that the collection of adult flounders from which the eggs of this species are taken at this station, was materially reduced by the disappearance of eel grass. This epidemic which has affected the growth along the entire Atlantic coast caused the flat fish to move their spawning grounds and added to the difficulty of egg collections.

At Woods Hole a new diesel-powered vessel has materially lowered costs for the collection of brood cod. A smaller number of adult cod was secured for eggs than in previous years but because of their better condition the hatch of fish was very satisfactory. In addition to the routine fish cultural work it was necessary to give considerable attention to the maintenance and upkeep of the extensive plant at Woods Hole since biological studies are also carried on during the summer months.

Anadromous species of Atlantic coast.—The commercial varieties handled on the Atlantic coast aside from the marine fish are the shad, yellow perch, white perch, glut herring, and Atlantic salmon. The latter is handled only at the hatchery at East Orland, Maine, and its substation. An exchange of eggs with the Canadian Government provided the usual supply of 1,000,000 eggs of this species. Part of them were allotted to the State of Maine hatcheries for incubation and distribution and the remaining share distributed as fingerlings in

the Penobscot River and other suitable waters. The Craig Brook station also handled large numbers of trout and landlocked salmon, the latter derived from the collection of 840,000 eggs made at the Grand Lake Stream (Maine) substation.

The principal point for shad propagation is at Fort Humphreys, Va., a short distance below Washington. The season opened here with the propagation of yellow perch in March, egg collections approximating 117,000,000, yielding over 105,000,000 fry. The majority of these were planted locally although 39,000,000 were allocated to the State of Virginia for stocking other waters tributary to the Potomac River. The shad work was of average magnitude, an output of 18,400,000 having been obtained.

At Edenton, N.C., effort was made to restore the output of shad to earlier numbers, but the encroachment of brackish water on the spawning grounds has resulted in a catch by the fishermen of large numbers of shad in which the eggs are not mature and are incapable of artificial incubation. The same also applied to the work with the glut herring at Edenton, the output being limited to 25,000,000 herring and 1,200,000 shad. Adverse weather limited the output of yellow perch also bringing it below the figures for the last several years. A limited number of white perch were propagated and planted in local waters. The Edenton station discontinued the propagation of striped bass which formerly had been conducted in the Roanoke River incooperation with the State of North Carolina. During the off season for the propagation of commercial species, the Edenton station is propagating and distributing bass and other pond fish. While the output was satisfactory in the case of bass, an influx of muddy water limited the production somewhat. The station was, however, able to fill all pending applications within its territory.

At Orangeburg, S.C., cooperative arrangements with the State of South Carolina were continued whereby the Bureau and the State jointly operated a shad hatchery on the Edisto River. This work yielded over 3,000,000 shad fry. Operations were restricted to one point only due to the fact that experiments of previous years have indicated that the most profitable location for this activity is at Jacksonboro on the Edisto River.

GAME FISH PROPAGATION

While the proportion of game fish in the total output of the hatcheries is numerically small, amounting to approximately 1.6 percent of the total or more than 115,000,000, its relative importance is far beyond this ratio. Through the influence of the Federal game fish hatcheries in improving fishing in interior waters, this activity has a bearing upon the interests of at least 10,000,000 people who to some extent fish for fresh-water species. Where the hatchery bred commercial fish are distributed at a comparatively small size a short time after hatching, it has been the increasing practice with the game varieties to rear them for as long a period as possible so that when planted they are subjected to natural enemies for only a short period before being large enough for the angler. The greater costs attending this type of work lie in the fact that added facilities and increased expenses for food, care, etc., are involved in the retaining of the fish for periods of 6 months to a year before distributing them. Also the cost of transporting these larger fish to more distant points is obvi-

ously much greater. The Bureau's objectives in this field were in general attained with gratifying success during the fiscal year 1933. There was an increase in the output of 3 species of trout, grayling, and practically all forms of pond fish. Of the latter the most important was the largemouth and smallmouth black bass, and an output of 5,250,000 represents a healthy increase. Since the majority of the fish which are distributed as fingerlings or larger come under the category of game fish it is significant that the distribution of these larger fish during 1933 increased 22.7 percent over the previous year. Owing to the divergent nature of the activities it has been necessary to make a division of a geographical character in reporting upon the stocking of interior waters.

ROCKY MOUNTAIN TERRITORY

While there is a considerable number of trout propagated at the hatcheries in the Pacific Coast States in connection with the main work of replenishing the salmon runs, the chief game fish cultural work in the West is conducted in the Rocky Mountain States and is very largely concerned with trout. Summarizing briefly the activities in this section it may be stated that the collections of black-spotted trout eggs at Yellowstone Park, a temporary seasonal activity, were about the average in number. This activity extends over two fiscal years. Consequently the figures cover July, August, and September, 1932, and do not take into consideration the collections made during May and June 1933.

A limited number of grayling eggs were handled on an experimental basis at Grebe Lake and the results were so encouraging that a permanent hatchery of small capacity was installed at this point.

At Mammoth Hot Springs operations were conducted as usual, yielding a total of approximately three quarters of a million trout fingerlings for distribution.

The Leadville (Colo.) station and its substations at Creede and Crystal Lake were operated as usual yielding the bulk of the brook trout eggs collected at the western stations. The take of this species in this field was in excess of 6,000,000. Concrete rearing ponds and a dwelling were constructed at the Crystal Lake substation and other improvements were made.

At the Springville (Utah) station considerable work was performed upon improvement of the hatchery spring water supply, necessitated by apparent pollution which had resulted in heavy mortality during the previous year. These improvements together with chlorination of the hatchery water supply have apparently overcome this difficulty.

There was constructed at Bear Lake, Utah, a substation intended to be operated for the restocking of Bear Lake which extends into Utah and Idaho. One million and two hundred thousand trout and salmon eggs were incubated at this point.

The hatching trough system at Springville was modified so as to provide a more adequate water supply for each trough, and the fish food or grinding room was remodeled.

The operations at Saratoga, Wyo., approximated those of previous years with the exception that the collection of eggs from station brood stock and from field stations was reduced.

The Spearfish (S.Dak.) station was rendered more efficient by the construction of a small auxiliary or substation on leased property several miles from the hatchery. This was necessitated by recurrent failure of the main spring water supply in the hatchery during the winter months. A suitable building was constructed and the eggs were incubated there for transfer to the main station for rearing when the water supply returned to normal. The output of this station was increased thereby, both as to numbers and size.

There was placed in operation during the year a new station in southern Idaho located near the town of Hagerman. The hatchery was constructed during the winter months and a superintendent's dwelling was completed at the close of the fiscal year. Several buildings already on the property were remodeled for use as dwellings and other purposes. The water supply was developed and considerable improvement to the grounds in general was effected. The station was stocked with eggs of rainbow and steelhead trout during the spring months, the latter having been obtained from collections at Williams Lake, Idaho. It was evident that owing to the relatively high temperature of the water a splendid rate of growth will be attained with the fish reared at this station. The Salmon (Idaho) station formerly operated for the propagation of commercial salmon will be discontinued.

The Dexter (N.Mex.) station, one of the two hatcheries for warm-water fish in the Western territory was very successul. A satisfactory output of fish, particularly bass, was attained, the total production being slightly over 400,000. Minor construction work in the nature of completion of projects already under way was carried on. These comprised the completion of the superintendent's residence and pump house and some additions and improvements to the pond system. Two wells were also drilled for the purpose of increasing the water supply.

The Bozeman (Mont.) station was connected up to utilize electricity for power and lights. The station distributed over 16,500,000 eggs and fingerling fish within its own territory requiring 26 trips by the fish car and 84 truck trips with at least 10 carloads of fish remaining on hand at the close of the year.

The two substations located in the Madison Valley at Ennis and Blaine Springs were also successful in their operations. The former was responsible for a collection of over 23,000,000 Loch Leven trout eggs and less than 1,000,000 rainbow trout eggs. At the new Blaine Springs substation the development work was the main activity, a 48-trough hatchery having been practically completed and a residence and garage being virtually ready for occupancy. Work was started on other buildings and the construction of 5 rearing ponds was also taken up.

At the Miles City auxiliary operated for the production of bass and other warm-water pond fish, the fall distribution was quite satisfactory. However, owing to the severe winter, there was a heavy loss of adult brood bass which necessitated replacement with 400 specimens in June. Arrangements have been made to secure the use of a leased pond better adapted for wintering the brood stock.

The season at Glacier Park substation was, as a whole, successful. Attempts to take brook trout eggs within the Park were not particularly gratifying, however, since only a limited number were obtained.

Some repairs were made to the pipe line supplying the hatchery building in order to assure a supply which would not become clogged by debris.

There was also placed in operation during the fiscal year a new rearing-pond establishment at Jackson Hole, Wyo. This consists of a group of 8 ponds 60 feet in length, built of concrete and fed by a spring with a flow of 6,000,000 gallons per day. The fish were transferred to this point from other hatcheries and were fed and reared under the supervision of an employee of the Bureau until the early fall when they were distributed. The distribution was materially aided by cooperation received from the National Park Service.

At the Crawford (Nebr.) station a satisfactory production of trout and pond fishes was obtained. The hatchery itself was used for the propagation of trout while the warm-water fish, bass, etc., were obtained from ponds located on the Fort Robinson military reservation and from other local private sources.

The supervision of this extensive territory rested with the Salt Lake City office which was the headquarters of the personnel engaged in biological investigations of the national forests and national parks and in the preparation of a stocking policy program for these waters. Owing to limited funds it was necessary to discontinue the services of the employees engaged in the latter work at the close of the fiscal year. The results of the biological studies are reported as an activity of the Division of Scientific Inquiry. Reports were made on the stocking policy covering 16 of the national forests. The headquarters of the Salt Lake City personnel were transferred to the University of Utah shortly before the start of the fiscal year under a cooperative arrangement whereby the university received the services of the district supervisor and the Bureau's biologist in charge, for the conduct of courses in fish culture and fishery biology. In return for this the Bureau received the necessary quarters and accommodations gratis.

NEW ENGLAND STATIONS

The hatcheries located at inland points in New England are concerned largely with the propagation of trout although effort is made to produce some of the pond fish required for northern territory.

The work of the St. Johnsbury (Vt.) station has largely been submerged by that of its auxiliary at York Pond. The main work has been centered at the latter point and the old St. Johnsbury station has been more extensively used as a distributing point.

This York Pond auxiliary in the White Mountain National Forest in New Hampshire is being developed as the main source of supply for brook-trout eggs. This development work during the past year included a distributing and filtering system for the water supply, development of spawning races, and a general expansion of the pond and water supply system of this large plant. Considerable has also been done on the improvement and completion of buildings and the installation and upkeep of equipment. Approximately 9,000,000 brook-trout eggs were taken. A considerable number of the older brood stock was distributed since it has been found that the older fish are less satisfactory for egg production.

Second only to the St. Johnsbury station in output and egg production is the station at East Orland, Maine, and its auxiliary at

Grand Lake Stream, Maine. The record for gradual improvement in production at these points was continued during the year. The Craig Brook station handled 1,000,000 Atlantic salmon eggs received by exchange with the Dominion of Canada. The substation at Grand Lake Stream collects the only supply of land-locked salmon eggs available to the Bureau. The take of this species was somewhat below the previous year, being 840,000. The auxiliary also reared and distributed a considerable number of brook trout and a limited number of Atlantic salmon.

In addition to these establishments the hatchery at Nashua, N.H., enjoyed a successful season, producing besides approximately one-half million trout, a limited number of smallmouth bass, salmon, and bullhead catfish. One thousand five hundred feet of new fence was installed during the year.

At Hartsville, Mass., there was produced an average number of trout for a normal season and sufficient brook-trout eggs were taken from station brood stock to permit shipments to other points. The personnel of this hatchery took charge of the collection of smallmouth bass fry from certain waters in Connecticut. Five hundred sixty-five thousand fry of this species were produced, a number greatly in excess of that of the previous year. This work in cooperation with the State of Connecticut simply comprises the taking by suitable methods of the newly hatched fry available in certain lakes which are closed to public fishing and in which, therefore, the development of an abundant stock of smallmouth bass would be of no public advantage.

The Pittsford (Vt.) experimental hatchery produced a considerable number of trout for distribution in addition to its primary work of investigation which is reported by the Division of Scientific Inquiry.

COMBINATION TROUT AND POND-FISH STATIONS

A limited number of hatcheries in the Middle West and Southeastern sections are in a border-line territory for trout and therefore propagate the cold-water trout and the warm-water pond fish such as bass. In the Middle Western section the Manchester (Iowa) station experienced the most productive year in its history. A yield of approximately 4,000,000 rainbow trout eggs from station brood stock was a high mark in this connection, and approximately 500,000 of these were produced from 2-year-old trout. The work with the pond fish was limited, but there was a fair output of smallmouth bass and rock bass. Some minor improvements were made to the station property.

At Neosho, Mo., the production of trout was very satisfactory although the output of pond fish was not quite up to normal, the latter condition being traceable to unfavorable weather. This station secures a large percentage of its stock of rainbow-trout eggs from a cooperative establishment at Bourbon, Mo. A total of 4,500,000 rainbow-trout eggs were received from the collections at this point and at the Neosho station itself. Eight hundred sixty-nine thousand pond fish including largemouth bass, crappie, sunfish, and channel catfish were likewise produced. A considerable proportion of these were derived from the leased ponds at Langdon, Kans. The costs of operating at the latter point were reduced approximately 50 percent per thousand fish.

Some experiments in selective breeding of rainbow trout have been continued at the Neosho station with preliminary results indicating a possibility of bringing 97 percent of the eggs to the eyed stage, and hatching 99½ percent of the eggs which have been eyed. The total loss in one selected lot of over 3,000 eggs was only 4.9 percent up to the 2-inch fingerling stage.

In the Eastern section the Erwin (Tenn.) station was improved by the installtion of a new double-deck system of hatching and rearing troughs. Electric light and power was also installed and arrangements were being made at the close of the fiscal year to replace the main water supply pipe line. Considerable mortality among the trout fingerlings was experienced as heretofore. The station has cooperated with one of the largest sportsmen's organizations by hatching a consignment of eggs and caring for the fish until they are distributed by the organization.

At Wytheville (Va.) the collection of eggs and the output of fish was quite satisfactory, a noticeable increase being achieved with the rainbow, brook trout, and rock bass. There were operated under the direction of this station two nurseries utilized for rearing of trout to larger fingerling size. This station was also supplied with electric current for lighting and power purposes. A considerable proportion of the output of trout was allocated for stocking national forest waters in the State of North Carolina.

The White Sulphur Springs station handled 5,500,000 trout eggs which represents a high mark in the history of the station's activities. This record was achieved at a reduction in cost. As heretofore a working agreement with the State of West Virginia remained in effect whereby the State supplied 1,000,000 brook-trout eggs for hatching. The resulting fish were distributed by the State together with some additional fingerlings which were furnished directly by the Bureau. Slightly under 50,000 warm-water fish including bass, rock bass, and bream were distributed. Considering the size of the station and the extent of its facilities the past season's work at this point presents a most gratifying record.

The new experimental fish hatchery recently established at Leetown, W.Va., is destined to handle both trout and pond fish for distribution, although facilities for the production of the latter have not yet been provided. The records of the experimental work are carried in the report of the Division of Scientific Inquiry. There were distributed during the fiscal year over 275,000 trout with a considerable number of large size fingerlings on hand at the close of the year. A brood stock is being built up for the purpose of egg production. Extensive improvements were made during the year including construction of 4 large ponds for brood stock and 12 new circular rearing ponds for trout. Three small bass ponds were constructed.

There was completed and placed in operation during the year a new hatchery at Flintville, Tenn., in the south central part of the State. This hatchery will handle both trout and pond fish, but no facilities for propagating the latter have as yet been provided. The equipment now consists of a hatchery building and several circular rearing ponds together with three earthen ponds. Consignments of brown-, brook-, and rainbow-trout eggs were shipped in. The rainbow trout did very well, but heavy loss was experienced with the other two forms, leading to the conclusion that the water conditions are unsuited

to them. The sharp demand, however, will be for rainbow trout and bass so that the unsatisfactory results with the brook trout particularly will in no way hamper the usefulness of the station. One carload of rainbow trout was furnished in addition to approximately 100,000 fingerlings delivered from the station.

WARM-WATER OR POND-FISH STATIONS

A group of hatcheries in the Southern States propagating bass, sunfish, crappie, catfish, etc., was called upon to supply a very heavy demand for these varieties required for stocking a tremendous area of streams and lakes throughout the South. As a whole, the production was up to the limits which might be reasonably expected from the space available for their work. There are natural limitations upon the production of pond fish per unit area of pond and the only means of increasing the output beyond certain limits is to provide additional pond space.

In Georgia, the Warm Springs station and a leased auxiliary near by produced 1,190,000 fish of which over 600,000 were bass. This exceeds the previous year's output by 64,000 and constitutes a new high record. The spring supplying the water for the ponds was protected by a frame shed or covering and by fencing.

At the Valdosta (Ga.) station which depends largely upon natural rainfall for water supply, there was a curtailment of output owing to limitations of the water. Slightly less than 100,000 fish were distributed but the output of this station consists almost entirely of larger fish—6 inches or more in size with consequent higher stocking value.

The Edenton (N.C.) station has concentrated more strongly upon the production of pond fish than upon the propagation of shad for which it was originally established, with a satisfactory output of the former.

At Tupelo, Miss., a successful season's output was achieved particularly in regard to the production of fingerlings which was increased to over 90 percent of the total as far as bass are concerned. A surplus of bream over the amount required for filling applications in that territory was also produced. A concrete retaining wall was constructed along the creek adjoining station property in order to prevent the pond banks from being washed away. The Aliceville (Ala.) substation formerly operated under this station was discontinued on January 1, being turned over to the State of Alabama. Over 78,000 bream and 5,000 bass were distributed prior to the transfer.

The Marion (Ala.) substation was placed in operation with 12½ acres of ponds available for use and two artesian wells drilled for supplying the ponds. Ninety-five thousand bass were produced during the spring months and distributed to applicants. The results achieved at this station are highly creditable since the first construction work was commenced during May 1932, and almost 100,000 fish were distributed within a year after that date.

At San Marcos, Tex., activities were on a normal basis with a considerable increase in the output of bass over the previous season. The output of crappie was somewhat reduced in view of the fact that drought dried up some of the natural and artificial tanks used for watering stock in that territory from which the supply of crappie has previously been obtained.

The Fort Worth substation, however, failed to produce as satisfactorily, with a considerable drop in the output of black bass. A new road was constructed on the property and considerable attention given to improving the drainage.

The Orangeburg (S.C.) station has been enlarged as far as the pond acreage is concerned, at intervals during the year. A new pond of approximately three-quarters of an acre was constructed and work was under way on the conversion of a large reservoir to provide an additional pond area of 2 acres. A new concrete walk was constructed connecting the station buildings. The occurrence of an untimely cold period resulted in the destruction of the early spawning of bass eggs causing a reduction in the output of this species. The output of the other varieties was practically normal with exception of the red-breasted bream which was produced with an increase of practically 100 percent. Special effort is being made to propagate this variety which is extremely popular in that section. The Orangeburg station supervised the cooperative propagation of shad on the Edisto River in conjunction with the State of South Carolina. Four million two hundred and five thousand eggs were collected, yielding a hatch of approximately 75 percent.

The Mammoth Springs (Ark.) station had a very satisfactory output, producing a larger number of fingerlings and a particularly good yield of smallmouth bass. This station produced approximately 400,000 fish and in view of its extremely low cost of operation has been of great value in supplying territory where the demand is heavy.

The Louisville (Ky.) station distributed an increased number of smallmouth and largemouth bass in comparison with the previous year. The station buildings and equipment were kept in excellent condition due to the utilization of relief labor furnished by the city of Louisville.

At the Natchitoches (La.) substation, administered from Neosho, Mo., the appropriation for construction has not been sufficient to provide a very extensive pond space. Brood stock of bass and other pond fish was placed in the ponds during January 1933. In view of the late start and the limited number of brood fish available, production, which will be largely distributed after the close of the fiscal year, is confined to a few bass fingerlings and approximately 125,000 sunfish.

The Tishomingo (Okla.) substation, also comes under the direction of the Neosho (Mo.) station, and at the former point there was some increase over the previous year's output. This station is giving special attention to the propagation of channel catfish, a species much desired, and a brood stock is now being reared. The primary need at this point has also been the extension of the pond acreage since only a portion of the possible area has been developed in ponds.

RESCUE OPERATIONS AND UPPER MISSISSIPPI WILD LIFE REFUGE

The activities centered at La Crosse, Wis., comprise the propagation of trout and bass, administration of a number of hatcheries within this territory and the conduct of rescue or salvage work in the Upper Mississippi Wild Life Refuge.

There was completed at the La Crosse station a large bass pond which produced over 108,000 fish. Rescue work was commenced on July 20 and terminated on October 8. The cost of the fish handled

was approximately $0.182 per thousand and the number of fish handled was in excess of 72,000,000, an increase of approximately 20,500,000 over the previous year. A considerable production of bass and miscellaneous fish was secured from controlled ponds, partly artificial in nature, located at various points within the refuge. Trout culture was centered at the La Crosse station with excellent results. There was a reduction in the losses caused by diseases and turbid water conditions. The trout produced here were distributed in Wisconsin, and Minnesota, particularly to 43 cooperative nurseries operated in conjunction with sportsmen's clubs. Within the refuge also were made collections of specimen fish for the Bureau's aquarium and for other public aquaria in the Middle West. The detailed analysis of the activities of the various substations coming under the La Crosse territory appears in the tabular part of this report. It should be added, however, that one new establishment at Lake Mills, Wis., was placed in operation during the year. The construction included a dwelling, hatchery building, and garage; the hatchery building including a small display aquarium. Three ponds were constructed and the work was started upon several other ponds which could not be completed on account of lack of funds. A limited number of trout were shipped to this station during the winter months and reared to fingerling size. No production of bass or pond fish was achieved since the brood stock were only introduced during the spring months, and the resulting hatch had not been collected at the close of the fiscal year.

AQUARIUM

The aquarium situated beneath the main lobby of the Department of Commerce Building has continued to be a feature of increasing attractiveness to the public. The display was maintained at approximately 1,000 specimens of 57 different species during the year. There were the usual number of replacements and some additions in the way of rarer and more unusual forms including the Alaska blackfish and Sunapee golden trout as well as the red breasted bream. Hatching equipment showing the incubation of both heavy and semi-bouyant eggs was displayed permitting the hatching of eggs of trout, salmon, shad, whitefish, pike-perch, and yellow perch. There was also a display of a model fish ladder. In addition to the fish there were shown some 10 species of aquatic reptiles, crustacea, etc. One of the features which has attracted considerable interest is the 6 tanks devoted to the showing of tropical aquarium fishes such as are suitable for the home aquarium. In this connection several meetings of the newly formed Washington Aquarium Society were held in the aquarium lobby. A source of particular gratification is the larger attendance by classes of school children, indicating that the aquarium facilities are being more widely utilized for educational purposes.

FISH CULTURAL NOTES

PRESERVATION OF SCRIM IN HATCHING BOXES

In last year's report mention was made of the use of nickel mesh hardware cloth in hatching boxes at the Woods Hole station. Further information was obtained during the year indicating the possibility of extending the life of the scrim as ordinarily used in the

hatching boxes in the marine hatcheries. The scrim rots rapidly due probably to bacteria contained in the natural waters used. This involves not only considerable expense for scrim but a heavy labor cost and depreciation of boxes. The Division of Fishery Industries has developed a preservative for vegetable fiber which is essentially chrome tannage. In preliminary tests of 1933 this preservative treatment indicated that the life of scrim in egg boxes could be materially increased. Large scale tests are now in progress at four hatcheries with several qualities of the chrome tanned scrim.

DISTRIBUTION IN NATIONAL PARKS AND NATIONAL FORESTS

Through cooperation of the United States Forest Service and the personnel of the Bureau's Salt Lake City office there has been worked out a definite program or policy of planting fish in national parks and national forests in the West. On the basis of surveys made by the Bureau's employees and with information provided by the forest rangers the Salt Lake City office has been able to make up a definite outline covering the species, size, and number of fish to be planted in those waters of the public domain. The program covers not only the fish provided by Federal hatcheries but in many instances those furnished from State hatcheries. It has been found in many cases that the supply of fish is insufficient to permit stocking to the extent called for by the program. However, it is now known that such fish as are planted are afforded the greatest possible chance of thriving and are distributed in accordance with the capacity of the streams to carry them as well as the demands of the fishermen.

DESTRUCTIVENESS OF SPIDERS

Observations made by the foreman of the Tishomingo (Okla.) station have shown clearly that spiders, apparently having a semi-aquatic habitat, can be and are responsible for a considerable loss of fish. It was shown that these spiders attacked and killed channel catfish fingerlings up to 2 inches in length. No definite information is available to show the full extent of the loss from this source at Tishomingo or whether the condition is prevalent elsewhere. Fully satisfactory means of control were not worked out but it is evident that clearing the grass and similar growth along pond banks in which the spiders live, will tend to limit the loss.

COOPERATIVE FISH CULTURE WITH MUNICIPALITIES

In the past the Bureau has cooperated with sportsmen's organizations in the conduct of rearing ponds, nurseries, etc., and has extended this work to collaborate with governmental units, specifically with one of the counties in Michigan. The idea has now been developed to a further point at Rochester, N.Y. In Monroe County, in which the city of Rochester is located, there are a number of lakes included in the park system which are suitable for the propagation of bass and other fish. Recognizing the desirability of utilizing recreational areas for the provision of additional recreation in the form of an adequate stock of fish to be more widely distributed, the cooperation of the Bureau was sought. In collaboration with the Izaak Walton League, the city of Rochester, Monroe County, and the New York State Conserva-

tion Department, a program was worked out and a competent representative of the Bureau detailed to that point to supervise the work and carry on studies and investigations indicative of the possibility of such an enterprise. Considerable success was achieved in the production of pond fish even though the work has not yet been fully organized and the initial obstacles overcome. The benefits of the plan have become so evident, however, that local authorities have approved the establishment of a small trout hatchery and rearing unit in conjunction with the original pond cultural activities. The Bureau, at the close of the fiscal year, was making plans for cooperating and assisting in this phase of the development.

There are several communities in the Middle West which have made real progress in the development of municipal fish culture and an extension of the policy to the Eastern States is highly desirable from the standpoint of recreation and conservation.

DISTRIBUTION OPERATIONS

In distributing an output of 7,202,155,600 fish and eggs the Bureau's distribution cars traveled a total of 111,784 miles, of which 11,100 were without cost. Detached messengers traveled 299,938 miles, of which 52,019 were also without cost. A number of railroad lines, realizing the incentives to travel to well-stocked fishing waters, transport fish and messengers attending them gratis or at reduced rates.

Automobile trucks used for distribution at the stations traveled 85,454 miles on distribution duty alone. Practically the entire United States was covered, with the exception of one State.

The Bureau aims in distributing fish to apportion the output of the hatcheries so that best results may be obtained and special consideration is given to stocking waters which are depleted or where fish will have the best opportunity to mature and reproduce.

During the year approximately 15,000 application blanks were furnished to persons who desired fish. These are sent out upon request for the stocking of public waters and occasionally private waters where there is an element of public benefit to be derived from the plant. The blanks provide space for a description of the waters to be stocked and from this information the Bureau is able to assign suitable species.

On account of the economy restrictions existing at the present time the Bureau is unable to meet the expense of delivering fish to points distant from the hatchery. Applicants should therefore receive the fish at the hatcheries if possible. The superintendents in charge of the hatcheries from which the consignments are to be furnished are empowered to arrange directly with the applicants the details of receiving the fish. Previously fish were delivered to the applicants' railroad station free of charge after notification to the exact time of delivery by telegram or letter. In all cases receptacles for carrying the fish should be provided by the applicant.

While the above-mentioned economy restrictions were not entirely effective until the close of the year, reference is made to them in this report in order that applicants may understand that, until further notice, delivery of the fish requested may be indefinitely delayed, unless they are in position to receive the fish at the hatchery and so designate when the application is returned to the Bureau.

Summary, by species, of the distribution of fish, fiscal year 1933

State and species	Number
Alabama:	
Largemouth black bass	338,111
Crappie	600
Sunfish	396,645
Alaska:	
Sockeye salmon	38,860,500
Humpback salmon	153,000
Brook trout	36,000
Arizona:	
Largemouth black bass	17,245
Sunfish	1,600
Arkansas:	
Rainbow trout	2,360
Crappie	1,800
Largemouth black bass	160,600
Smallmouth black bass	118,000
Rock bass	5,500
Sunfish	39,550
California:	
Chinook salmon	5,943,200
Brook trout	27,000
Colorado:	
Catfish	128
Steelhead salmon	180,000
Rainbow trout	1,319,360
Black-spotted trout	759,000
Loch Leven trout	1,659,000
Lake trout	72,000
Brook trout	3,706,460
Largemouth black bass	7,760
Smallmouth black bass	60
Sunfish	6,060
Connecticut:	
Brook trout	7,510
Loch Leven trout	150,280
Smallmouth black bass	308,000
Delaware: Largemouth black bass	750
Florida:	
Largemouth black bass	1,025
Sunfish	4,300
Georgia:	
Catfish	225
Rainbow trout	286,450
Loch Leven trout	7,200
Brook trout	36,400
Largemouth black bass	559,860
Rock bass	600
Sunfish	420,750
Hawaii: Rainbow trout	12,000
Idaho:	
Catfish	500
Chinook salmon	2,745,000
Steelhead salmon	140,000
Rainbow trout	631,025
Black-spotted trout	1,120,400
Brook trout	3,160
Illinois:	
Catfish	3,550
Crappie	1,625
Rainbow trout	500
Largemouth black bass	5,022
Smallmouth black bass	1,200
Sunfish	2,560
Indiana:	
Catfish	4,264
Rainbow trout	40,000
Loch Leven trout	19,500
Brook trout	38,000
Crappie	9,150
Largemouth black bass	33,615
Smallmouth black bass	67,945
Rock bass	3,650
Pike perch	2,000,000
Sunfish	36,980
Yellow perch	1,120
Iowa:	
Catfish	19,796,022
Buffalofish	[1] 94,935,850
Carp	[1] 25,269,575
Rainbow trout	50,900
Iowa—Continued.	
Brook trout	234,800
Loch Leven trout	47,000
Crappie	5,760,235
Largemouth black bass	118,213
Smallmouth black bass	250
White bass	4,846
Sunfish	6,311,520
Pike and pickerel	70,224
Fresh-water drum	6,586
Yellow perch	43,671
Miscellaneous fishes	1,293,500
Kansas:	
Catfish	16,425
Rainbow trout	40,255
Crappie	14,635
Largemouth black bass	26,745
Rock bass	800
Sunfish	88,000
Yellow perch	420
Kentucky:	
Crappie	750
Largemouth black bass	155,950
Smallmouth black bass	174,175
Rock bass	3,650
Sunfish	10,100
Louisiana:	
Largemouth black bass	7,250
Sunfish	135,350
Maine:	
Atlantic salmon	954,550
Landlocked salmon	839,100
Lake trout	150,000
Brook trout	787,940
Smallmouth black bass	2,250
Cod	892,455,000
Haddock	509,457,000
Winter flounder	2,414,892,000
Maryland:	
Catfish	450
Rainbow trout	15,000
Loch Leven trout	24
Brook trout	19,220
Crappie	1,000
Largemouth black bass	23,857
Smallmouth black bass	7,430
Sunfish	1,365
Yellow perch	200,105
Massachusetts:	
Catfish	2,600
Chinook salmon	50,000
Rainbow trout	106,200
Loch Leven trout	100,650
Brook trout	160,370
Largemouth black bass	200
Smallmouth black bass	170,385
Mackerel	5,127,000
White perch	635
Cod	1,103,509,000
Haddock	224,326,000
Pollock	13,681,000
Winter flounder	718,370,000
Michigan:	
Catfish	10,000
Whitefish	44,700,000
Landlocked salmon	10,000
Steelhead salmon	99,632
Rainbow trout	321,620
Loch Leven trout	34,720
Lake trout	18,272,200
Brook trout	986,600
Crappie	1,465
Largemouth black bass	36,500
Smallmouth black bass	41,200
Sunfish	13,420
Yellow perch	2,120
Minnesota:	
Catfish	2,948,900
Buffalofish	[1] 763
Carp	[1] 554,987

[1] All carp and buffalofish shown in above table are planted in commercial areas of the Mississippi River.

Summary, by species, of the distribution of fish, fiscal year 1933—Continued

State and species	Number
Minnesota—Continued.	
Rainbow trout	45,025
Loch Leven trout	67,500
Lake trout	85,000
Brook trout	76,750
Crappie	5,400,615
Largemouth black bass	217,754
Smallmouth black bass	600
White bass	6,114
Pike perch	15,005,000
Sunfish	6,330,745
Fresh-water drum	8,215
Pike and pickerel	21,110
Yellow perch	175,695
Miscellaneous fishes	4,971,013
Mississippi:	
Largemouth black bass	207,115
Sunfish	234,075
Missouri:	
Catfish	1,875
Rainbow trout	157,210
Crappie	30,550
Largemouth black bass	83,281
Rock bass	18,900
Sunfish	53,235
Yellow perch	2,410
Montana:	
Catfish	5,065
Silver salmon	502,000
Steelhead salmon	235,000
Rainbow trout	2,023,000
Black-spotted trout	3,837,240
Loch Leven trout	11,966,400
Brook trout	370,910
Grayling	146,250
Crappie	89,500
Largemouth black bass	9,135
Sunfish	109,625
Yellow perch	6,610
Miscellaneous fishes	3,750
Nebraska:	
Catfish	18,200
Rainbow trout	308,906
Loch Leven trout	400,520
Brook trout	137,760
Crappie	1,650
Largemouth black bass	11,540
Sunfish	81,005
Yellow perch	150
Nevada:	
Catfish	3,000
Rainbow trout	520,120
Loch Leven trout	250,320
Brook trout	8,500
Crappie	500
Largemouth black bass	1,800
Sunfish	5,060
New Hampshire:	
Catfish	1,200
Landlocked salmon	16,215
Rainbow trout	44,000
Loch Leven trout	975
Lake trout	54,000
Brook trout	1,010,296
Smallmouth black bass	14,275
New Jersey:	
Rainbow trout	3,260
Brook trout	1,200
Largemouth black bass	4,465
Sunfish	1,000
New Mexico:	
Rainbow trout	645,000
Loch Leven trout	1,000,260
Largemouth black bass	174,325
Sunfish	140,470
New York:	
Catfish	4,724
Landlocked salmon	22,500
Rainbow trout	263,250
Loch Leven trout	348,763
Lake trout	170,770
Brook trout	2,152,939
Crappie	450
New York—Continued.	
Largemouth black bass	26,506
Smallmouth black bass	127,565
Sunfish	1,629
Winter flounder	32,268,000
Smelt	1,000
Whitefish	1,071,000
Cisco	15,100,000
North Carolina:	
Catfish	30
Shad	1,200,000
Glut herring	25,000,000
Rainbow trout	254,700
Loch Leven trout	2,800
Brook trout	92,300
Crappie	6,621
Largemouth black bass	208,815
Rock bass	1,575
Warmouth bass	4,740
Sunfish	14,900
White perch	3,350,000
Yellow perch	3,750,495
North Dakota:	
Catfish	800
Rainbow trout	1,200
Crappie	8,010
Largemouth black bass	11,620
Sunfish	28,125
Ohio:	
Catfish	1,300
Whitefish	110,000,000
Rainbow trout	33,450
Loch Leven trout	4,350
Brook trout	55,200
Crappie	1,100
Largemouth black bass	14,085
Smallmouth black bass	7,800
Pike perch	110,000,000
Sunfish	20,000
Yellow perch	240
Oklahoma:	
Catfish	24,297
Rainbow trout	1,000
Crappie	36,035
Largemouth black bass	79,009
Rock bass	300
Warmouth bass	375
Sunfish	87,010
Yellow perch	640
Oregon:	
Chinook salmon	14,554,000
Silver salmon	550,000
Sockeye salmon	3,010,650
Steelhead salmon	125,000
Rainbow trout	5,400
Black-spotted trout	1,033,200
Brook trout	34,050
Pennsylvania:	
Catfish	38,050
Rainbow trout	351,200
Loch Leven trout	364,090
Brook trout	1,547,195
Crappie	6,895
Largemouth black bass	28,129
Sunfish	52,060
Yellow perch	3,260
Rhode Island:	
Rainbow trout	10,000
Brook trout	1,870
South Carolina:	
Catfish	120
Rainbow trout	359,150
Loch Leven trout	4,500
Brook trout	36,800
Crappie	5,650
Largemouth black bass	153,486
Rock bass	2,550
Warmouth bass	8,065
Sunfish	71,850
Shad	3,137,000
Yellow perch	2,100

Summary, by species, of the distribution of fish, fiscal year 1933—Continued

State and species	Number
South Dakota:	
Catfish	12,000
Rainbow trout	212,650
Loch Leven trout	364,670
Brook trout	280,092
Crappie	1,650
Largemouth black bass	7,060
Sunfish	2,630
Yellow perch	8,450
Tennessee:	
Catfish	6,900
Rainbow trout	397,368
Loch Leven trout	103,835
Brook trout	44,550
Largemouth black bass	80,455
Smallmouth black bass	8,700
Rock bass	22,265
Sunfish	41,988
Texas:	
Catfish	18,785
Rainbow trout	10,000
Crappie	36,985
Largemouth black bass	650,145
Warmouth bass	5,650
Sunfish	99,850
Rio Grande perch	3,685
Yellow perch	5,000
Utah:	
Catfish	1,900
Whitefish	500,000
Landlocked salmon	50,000
Rainbow trout	504,813
Black-spotted trout	369,500
Loch Leven trout	463,560
Brook trout	700,000
Crappie	11,750
Largemouth black bass	6,321
Grayling	50,000
Sunfish	14,090
Yellow perch	750
Vermont:	
Steelhead salmon	24,625
Atlantic salmon	20,000
Landlocked salmon	20,365
Rainbow trout	100,559
Lake trout	52,000
Black-spotted trout	21,000
Brook trout	1,738,438
Largemouth black bass	2,680
Smallmouth black bass	6,000
Virginia:	
Catfish	150
Rainbow trout	284,273
Loch Leven trout	14,160
Brook trout	190,355
Crappie	11,655
Largemouth black bass	183,351
Virginia—Continued.	
Smallmouth black bass	23,683
Rock bass	35,315
Sunfish	49,474
Shad	18,400,000
Common pike	850
Yellow perch	199,185,000
Washington:	
Chinook salmon	20,615,282
Sockeye salmon	15,279,000
Chum salmon	21,700,000
Silver salmon	3,300,752
Steelhead salmon	1,063,319
Humpback salmon	2,607,904
Rainbow trout	68,250
Black-spotted trout	2,720,200
Loch Leven trout	67,200
Brook trout	232,260
West Virginia:	
Catfish	6,978
Rainbow trout	458,125
Loch Leven trout	109,189
Brook trout	1,057,080
Crappie	4,090
Largemouth black bass	39,720
Smallmouth black bass	5,700
Rock bass	1,800
Sunfish	13,965
Wisconsin:	
Catfish	6,708,440
Buffalofish	[1] 185,760
Carp	[1] 957,150
Rainbow trout	375,885
Loch Leven trout	199,040
Lake trout	10,000
Brook trout	1,004,200
Pike and pickerel	77,430
Crappie	3,656,113
Largemouth black bass	174,087
Smallmouth black bass	7,600
Sunfish	5,019,325
Pike perch	770,000
Yellow perch	112,795
White bass	10,560
Fresh-water drum	200
Miscellaneous fishes	1,373,350
Wyoming:	
Catfish	35,000
Rainbow trout	870,890
Black-spotted trout	8,383,700
Loch Leven trout	1,079,240
Lake trout	100,000
Brook trout	798,455
Crappie	47,900
Largemouth black bass	125,000
Sunfish	52,000
Yellow perch	37,200

[1] All carp and buffalofish shown in above table are planted in commercial areas of the Mississippi River.

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